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ABSTRACT

In five chapters, this document's first part reports on research on the interrelationship of school and municipal finance in New Hampshire. The document's second part briefly summarizes the research report and discusses policy changes suggested by the results. Chapter 1 of the research report describes New Hampshire schools and the state aid system, including foundation aid, business profits tax (BPT) revenues, and categorical aid programs. Chapter 2 discusses theories of school finance equity and wealth neutrality and the effect of municipal overburden on school spending. In chapter 3 the author reports on a questionnaire survey of 74 New Hampshire superintendents, board members, and town officials on the estimated effects of foundation and BPT aid levels on district and municipal spending. Chapters 4 and 5 review the methodology and results of econometric analyses estimating school spending responses to both state aid and municpal overburden and simulating the impact of alternative state aid formulas on wealth neutrality. An appendix provides a copy of the survey questionnaire. In the document's second part the authors review the research and its results and emphasize the strong relationship found between school spending and municipal finance. (RW)

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The Impact of Inter-Governmental Grants and Municipal Overburden on School Spending and Simulations of the Impact of Alternative Grant Formulas

A Report Submitted to the
National Institute of Education

By

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CHAPTER I

DESCRIPTION OF THE SCHOOL SYSTEM AND STATE AID TO PRIMARY AND SECONDARY EDUCATION IN NEW HAMPSHIRE

New Hampshire has 169 school districts that were responsible for educating 163,868 children in 1981-82. These districts vary considerably in their size, responsibilities, governance and finance structure.

New Hampshire school districts range in size from 9 to 13,885 students. Eleven school districts do not maintain any local schools; their voters have decided to tuition resident children to schools in nearby communities. There were 90 high schools in the state in 1981-82; ranging in size from 7 students in Errol, a small mountain town with a two year high school (juniors and seniors travel to the city of Berlin), to 2800 in Nashua, the state's second largest city. The only district with more than one high school is Manchester, the largest city, which maintains three high schools.

The State Board of Education has assigned New Hampshire's 169 school districts to 53 school administrative units, each administered by a superintendent of schools. Sixteen of the 53 superintendents have single district school administrative units; the remaining 37 have from two to nine separate school districts, each with its own school board. In these latter cases superintendents report to each local school board, the combined local boards that comprise the school administrative unit, and to the Commissioner of Education.

Twenty-eight of these school districts are cooperative school districts, created through a consolidation or merger of 103 out of New Hampshire's 236 "pre-existing districts" or towns. Four of these cooperative districts are secondary districts only. The pre-existing school districts in these four cooperatives provide elementary and/or middle school education on their own.

New Hampshire's public schools rely on the local property tax to finance education more than any other state in the nation--typically 87 to 88% each year, with the balance of revenues provided about equally from the state and federal governments. Each school district is an independent taxing authority. Except for nine of the city districts, where the city council votes the annual school budget, New Hampshire law enables the voters in each school district to establish their local school budget. (In Concord, the State Capital, the school board is fiscally independent.)

School budgets are developed in a manner similar to that followed by most school districts in the United States: staff requests are reviewed by appropriate supervisors up to the superintendent, who submits a budget recommendation to the school board. Each board determines what to recommend to the voters. In 56 districts, however, that have adopted New Hampshire's municipal budget law, the budget goes from the school board to a municipal budget committee before it goes to the voters. Voters may not increase the budget committee's dollar request by more than ten percent.

Once the school budget is set, it is the responsibility of municipal officials to collect the property tax receipts from each property owner, and make payments to the school district treasurer of the school district's share. That share is determined by a school tax rate which is established by the state Commissioner of Revenue Administration, who also establishes the municipal and county tax rates. The school, municipal and county tax are separately itemized on each property owner's tax bill.

State Aid to Education

The purpose of State Aid to education (according to RSA 198:8) is "...to share in the costs of public elementary and high school education of the local school districts of the state to the end that: (1) the more needy school districts may be assisted in providing an adequate education program; (2) education throughout New Hampshire may be improved; and (3) assistance and incentives may be provided for the formation of cooperative school districts and authorized regional enrollment areas."

The state aid programs established to implement this purpose are Foundation Aid, Building Aid, Sweepstakes Aid, School Administrative Unit Aid, Foster Children Aid, Child Benefit Aid, Reorganization Aid, Regional Center Vocational Tuition and Transportation Aid, and Special Education Aid. In addition, portions of the Business Profits Tax are applied to school district budgets to reduce property taxes.

1. Foundation Aid ($3,871,000 in 1981)

The major state commitment to equalization of educational opportunity is RSA 198:10 -- Foundation Aid. The purpose of Foundation Aid, according to statute, is "to more nearly provide equal public school educational opportunity throughout the state. . ." (1955 amendments; also Gilsum v. Modnadnock Regional School District. (1964) 105 NH 361, 202 A2d 790).

In order to establish a basis for computing the amount of aid, the 1955 amendments to the Foundation Aid law established the cost of a basic educational program as $200 per pupil for elementary students and $300 for each high school student. The Foundation Aid amount was to equal the difference between what a 14 mil effort raises and the basic cost of $200 or $300. Further amendments in 1957 provided, in effect, that the full or maximum foundation program cost for a local school district would be determined by multiplying the number of elementary and high school pupils in the district by the state average cost per pupil during the year preceding the year of actual payment. Although the 14 mil minimum effort has remained intact, property values have risen rapidly in comparison with the cost of education. As a result, the number of school districts eligible for Foundation Aid under the 1957 provision has decreased substantially.

Full funding of the Foundation Aid law would provide approximately 10% of total expenditures for elementary and secondary education in New Hampshire. However, this program has never been fully funded. In 1979-80, the Foundation Aid law was funded at 11% of its full level, providing approximately 1% of total costs of public school education. The appropriation for 1982-83 and 1983-84 has been further reduced from the current level of $3,871,268 to $3,630,000.

Since the 1957 amendments, whenever appropriations necessitate the reduction of actual Foundation Aid to be distributed (which has been the case every year), these reductions have been accomplished by reducing the elementary and high school cost allowances per pupil, until the total of the resulting entitlements equals the amount appropriated. This approach of reducing the costs allowed, while holding the 14 mil local effort constant, has concentrated the available money in the very poorest districts, and has gradually but dramatically reduced the number of districts receiving Foundation Aid. In 1979-80, 38 of the 168 New Hampshire school districts received Foundation Aid, compared with the 122 districts which would have been eligible with full funding, and with the 91 districts that actually received aid ten years earlier. Even these eligible districts received much less than they would have received under full funding; Allenstown, the district with the least property wealth

per pupil in New Hampshire received $290 per pupil from Foundation Aid in 1979-80, whereas full funding would have provided $715 per pupil.

2. School Building Aid ($5,700,000 in 1981)

School Building Aid provides 30% of the amount of the annual payment of principal for school construction and/or major renovation, plus an additional 5% per pre-existing district for cooperative school districts, to a maximum 55%. This is a flat percentage grant regardless of district wealth. School Building Aid has historically been funded at appropriation levels which fulfill the intent of the law.

3. Special Education and Vocational Education Aid ($9,800,000 and $637,450 in 1981)

These categorical aid grants have made up an increasing percentage of state aid. Through 1980-81, Special Education Aid was allocated only for out-of-district placements with school districts responsible for double the state average tuition before state funding.

Prior to 1981, school district property wealth was not considered as a factor in allocating special education aid. A new special education statute (RSA 186-C) which became effective on July 1, 1981, states, "it is hereby declared to be the policy of the state that all children in New Hampshire be provided with equal educational opportunities." This reiteration of the equal educational opportunity doctrine also found in RSA 198:10 (the Foundation Aid Law) is supported by a new funding formula for special education which provides funds on the basis of district property wealth. Annual funding was set at $10,000,000 in 1981-82 and 1982-83, approximately ¼ the total cost of special education.

Regional secondary vocational education centers are being established through state funding. Twenty centers are envisioned as the ultimate goal. The state pays for the construction of the regional centers, and the home district is then responsible for operational costs. In order to encourage other districts in the region to send students to the Regional Center, the state provides 75% of the tuition charges plus mileage payments.

4. Other Categorical and Flat Grant Aids

A. Statewide Supervision Aid ($341,600 in 1981) is intended to aid school districts in providing central office administrative services. The formula calls for distribution on the basis of equalized valuation, with a minimum of $2,500 and a maximum of $7,500 allocation per School Administrative Unit. In practice, no unit has received more than $5,000. This aid was eliminated in 1982-83.

B. Foster Children Aid ($210,000 in 1981) pays $200 for tuition of children who are Wards of the State, with the provision that if insufficient funds are appropriated, uniform probation reductions are to take place. In 1979, legislation was enacted to expand payments, but the legislation was not funded. Foster Children Aid was eliminated in 1982-83.

C. Reorganization Incentive Aid ($366,000 in 1981) is a system of flat grants for Cooperative School Districts, and authorized regional enrollment area schools. The entitlement was established at $45 for elementary pupils, $60 for junior high pupils, and $75 for high school students. Since 1971-72, eligible school districts have received between 33% and 37% of full entitlements. This aid was also eliminated in 1982-83.

D. Sweepstakes Aid ($3,015,758 in 1981): This form of aid, from proceeds of the New Hampshire Sweepstakes, is a flat grant per pupil and is distributed regardless of district wealth. Per pupil grants have ranged from $5.79 in 1970-71 to $33.41 in 1976-77. The amount of aid to be received in each year is highly variable and almost completely unpredictable.

E. Child Benefit and Dual Enrollment Aid ($226,008 in 1981): This state aid program was designed to strengthen the education of children in non-public schools by allowing simultaneous enrollment in a public and a non-public school, and by expanding the list of services which school districts may provide for pupils enrolled in non-public schools. No school district has applied for dual enrollment aid for several years. Schools are eligible for 70% of the cost of child benefit programs, but the funding level has averaged only about 65% of the full entitlement in recent years. Child Benefit Aid was reduced in the 1981-82 budget to $200,000, and further reduced to $100,000 in 1982-83.

F. School Lunch Aid ($791,782 in 1981): Starting with the fiscal year 1972, federal law has required that state funds be provided to match a portion of the federal funds distributed to school districts and to non-public schools to reimburse a part of the cost of each meal served to school children. From 1972 all states were required to match 12 percent of the federal funds. Starting with the fiscal year 1977-78, all states are required to match 30 percent of the designated federal funds. At present, this matching requirement is not scheduled to go any higher. For states in which per capita income is below the national average, the 30 percent match is reduced by a percentage equal to the ratio of state to national average incomes. Thus, for New Hampshire the present match factor is .28 rather than .3.

Most of the state funds are distributed on the basis of a flat amount for each eligible meal served, in the same way as are the federal funds. About 10 percent of the funds are used, along with designated federal funds, to help selected school districts pay for needed food service equipment. Such school districts must have a relatively high percentage of low-income families.

5. Business Profits Tax Distributions

New Hampshire levies a tax at the effective rate of 9.1% on business profits and distributes a substantial portion of the revenues from this tax to cities and towns to lessen reliance on the local property tax. The distribution is specifically divided between the municipal and school budgets. Total revenues collected under this tax in 1981 were $57,340,000 , with $36,711,248 distributed to cities and towns. Of this amount, $14,673,903 was earmarked for reduction of the municipal tax rate and $22,037,345 was earmarked for lowering of the school tax.

The apportionment of BPT distributions to localities is based primarily on tax effort and population. The apportionment to reduce municipal, school, and county taxes is based on the respective shares each received from an earlier (to 1970) locally imposed and administered tax on business inventory called the stock-in-trade tax. The state initially guaranteed each community would receive 10% more under the BPT (reduced to 5% after two years) removed the guarantee in 1981, and scheduled reductions of the local share over the next several years.

While the Business Profits tax school share distribution functions as an indirect school aid, it may not be claimed as revenue to a school district.[1] This may alter its perception by voters at town meetings.

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[1] Some school districts have recently begun to mention the BPT school share amounts in footnotes to their annual income statements. The new (1981) state budget form for schools provides a line item for BPT.

Aids Analyzed in this Report

Of the school aids described above, this report analyzes the effects of only two: Foundation Aid and the BPT school share. This is because our interest is in assessing the effects of the general aids currently awarded for school operating expenditures, as well as simulating the results of altering these general aids. Although School Building Aid and Special Education Aid were the largest transfer programs to school districts in New Hampshire in 1981, their use was officially confined to specific programs, and Building Aid was officially confined to the capital account. Of the general expenditure supplements, Foundation Aid and the BPT school share were by far the largest.

CHAPTER II

THEORY OF SCHOOL FINANCE EQUITY AND THE DETERMINANTS OF SCHOOL SPENDING

Ever since the pioneer study by Fabricant (1952), there have been numerous studies of the determinants of local public expenditures by type [see Sacks and Harris (1964), Fisher (1964), and Moras (1966), among others] with local educational expenditures perhaps the most studied in recent years. The upsurge of interest in the determinants of expenditures for locally provided public education results in part from a series of federal and state court decisions relative to the concept of equity in school finance.[1] Numerous notions of equity have been proposed for both litigative and investigative purposes, and several are discussed below.

The present study capitalizes upon much of the work done in educational spending determinant studies to date, and applies determinant analysis to the equity issue. In particular, we seek to determine the prospective impact of alternative school finance reforms in New Hampshire. In doing so, we also investigate two important sub-issues in the area of school finance: (1) the impact of intergovernmental flat grants on school spending and (2) the relevance and impact of the municipal overburden concept in a largely rural state. Our methodology for simulating school district response to finance reform is similar to that employed by Martin Feldstein (1975) in several respects, but different in several crucial respects. The main similarities and differences are discussed below. Our results are quite different from Feldstein's.

The first section below discusses alternative concepts of equity in school finance. The second section discusses the theory of intergovernmental grants in support of local expenditures. The third section discusses the concept of municipal overburden.

Concepts of Equity in School Spending

The notion of equity implies equality of an attribute as it is distributed across individuals or groups. The notion is highly malleable because the attribute to be distributed and the groups across which distribution is sought to be equal are subject to choice. For example, tax equity could be interpreted as suggesting an equality of (1) tax rates, (2) tax bills, or (3) tax prices (which come in two varieties as explained below), across (1) tax jurisdictions, (2) taxpayers, or (3) the recipients of services paid for through the public fisc. Virtually all combinations of the above have been used at one time or another to define the notion of equity in school spending, with added variation resulting from attention to cost differences in the provision of public education.[2]

It is useful to consider several basic notions of equity in the finance of local school education and the tax systems aimed at achieving them. First, we

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[1]There are a number of reviews of the issues relevant to these judicial proceedings, including Coons, Clune, & Sugarman (1970) and Brown (1978).

[2]Further and more detailed discussions of the equity concept are available in numerous sources, including Carroll, et. al (1979).

consider the concept of taxpayer equity, which actually has two basic variants. The first of these two variants is referred to here as tax rate equity, and the second as tax dollar equity. Tax rate equity refers to a situation of equal public expenditures per unit tax rate paid, while tax dollar equity refers to a situation of equal public expenditure per dollar paid in tax. As is clear from the definitions there is nothing about either of these variants unique to the issue of school finance. As applied to school finance, the notion of taxpayer equity has been modified in some studies to allow for cost difference in the provision of school services, or for uncontrollable expenditures on the municipal side of the local budget (municipal overburden).

A second notion of equity is expenditure equality. As applied to school finance, this notion is generally taken to mean equality of school operating expenditures per pupil, although the notion is frequently modified to allow for cost differences in the delivery of school services and/or the presence of special needs students. Expenditure equality and its variants are most efficiently achieved through state take-over of the educational system. Only one state (Hawaii) actually has a state-operated system of public education. In the other forty-nine states, there is apparently considerable weight placed on local freedom of choice in the provision of this public service. In light of the importance attached by most states to the element of local choice, very little attention is paid in this analysis to expenditure equality as a goal of school finance reform.

Over the post-war period, numerous institutional reforms have been proposed to make school district finance and/or expenditures more equitable, according to one or more criteria, across school district boundaries within state. The most popular type of school finance reform has been the Foundation Aid program, wherein the state guarantees to each school district an effective minimum revenue per pupil provided that the tax rate in the school district is set at or above a stated minimum level. As indicated in Chapter I, New Hampshire currently has such a program in force, with a minimum equalized school tax rate of 14 mils, and minimum revenue of $200 per elementary student and $300 per high school student. This minimum revenue guarantee can be regarded as a way of equalizing effective tax bases. For the first 14 mils of local tax, each locality is guaranteed the revenues that would be forthcoming in a district where 14 mils raised the stated minimum cost levels. Hence, Foundation Aid would be a guarantee of tax rate equity if all districts levied a school tax of 14 mils. To the extent that there is variation in school tax rates, Foundation Aid falls short of guaranteeing this form of taxpayer equity.

An important feature of Foundation Aid plans is that they are effectively flat grant programs, as opposed to matching programs, for most districts. As most districts exert more than the minimum level of tax "effort," and would do so even in the absence of Foundation Aid, their own tax actions do not affect the amount received in Foundation Aid. This is a critical difference between Foundation Aid programs and a more recently developed family of school aid formulas referred to commonly as District Power Equalizing (DPE) formulas.

Under the simplest DPE formula, school districts with per pupil property values below that of a key district receive a matching contribution from the state for each education tax dollar raised in the district, with the matching rate varying across districts in inverse proportion to the total equalized property value per pupil in the district. There is no matching aid for the key district, and all districts with per pupil property values above that of the key district may forfeit

dollars to a state equalization fund at a rate also depending on their property wealth per pupil in the district. This program has the effect of setting the effective tax base per pupil for all school districts in the state, or all districts below the key district (depending on whether the plan requires actual contributions from "wealthy" districts) equal to the actual per pupil tax base of the key district, while leaving the local tax rate to vary freely.

It is convenient to refer to DPE plans which require contributions from "wealthy" districts as "complete," and plans with no contributions as "partial." Of course, a DPE plan which takes the district with the highest property tax base per pupil as the key district is complete without requiring a contribution from any district. However, such a plan must be supported by large contributions from an alternative tax base.

A complete DPE formula achieves the tax-rate variant of taxpayer equity by definition. Under a complete DPE plan, all taxpayers pay the same tax rate per dollar of school expenditures per pupil. Tax dollar equity is achieved under DPE only if communities involved in the program have identical distributions of residential property values.

The Wealth Neutrality Criterion

The present analysis concentrates on the notion of equity implied by the landmark court decision in school finance (Serrano vs. Priest, U.S. Supreme Court, 1973). According to that decision, a state system of school finance is equitable if the pattern of school district spending that results from it is not influenced by disparities in school district property wealth. This decision can be interpreted in two ways; on the one hand it can be taken to mean that the effective property wealth of school districts should be equalized so as to nullify it as a factor in the spending decision. According to this interpretation, spending disparities resulting from differences in local tax rates may exist and may even show a positive correlation with property wealth disparities as long as the effective tax base financing the expenditure is not correlated with property wealth. This criterion is automatically satisfied by any complete DPE formula because complete DPE formulas equalize effective property tax bases.

On the other hand, the ruling has been interpreted more strictly [first by Feldstein (1975)] to mean that any correlation of actual spending with school district property wealth is inequitable. Under Feldstein's interpretation, spending differences may occur, but this difference may not be correlated with property wealth. According to Feldstein, the pattern of actual spending differences across school districts must be wealth neutral.

While the former of these two interpretations of the Serrano decision could be implemented by a simple DPE formula, Feldstein pointed out that DPE does not necessarily meet the Serrano criterion under its second interpretation. Feldstein argues that a simple DPE goes too far in the direction of effective property tax base equalization to meet (his interpretation of) the Serrano criterion. The basis for Feldstein's argument and his methodology are presented in Chapter IV.

The present analysis is aimed at simulating the effect of a fully funded Foundation Aid program in New Hampshire and two alternative complete DPE formulas. We compare the simulated impacts of these reforms with the equity outcome mandated in the Serrano decision under both of its interpretations. The methodology of the simulation is presented in Chapter IV, and the results are presented in Chapter V.

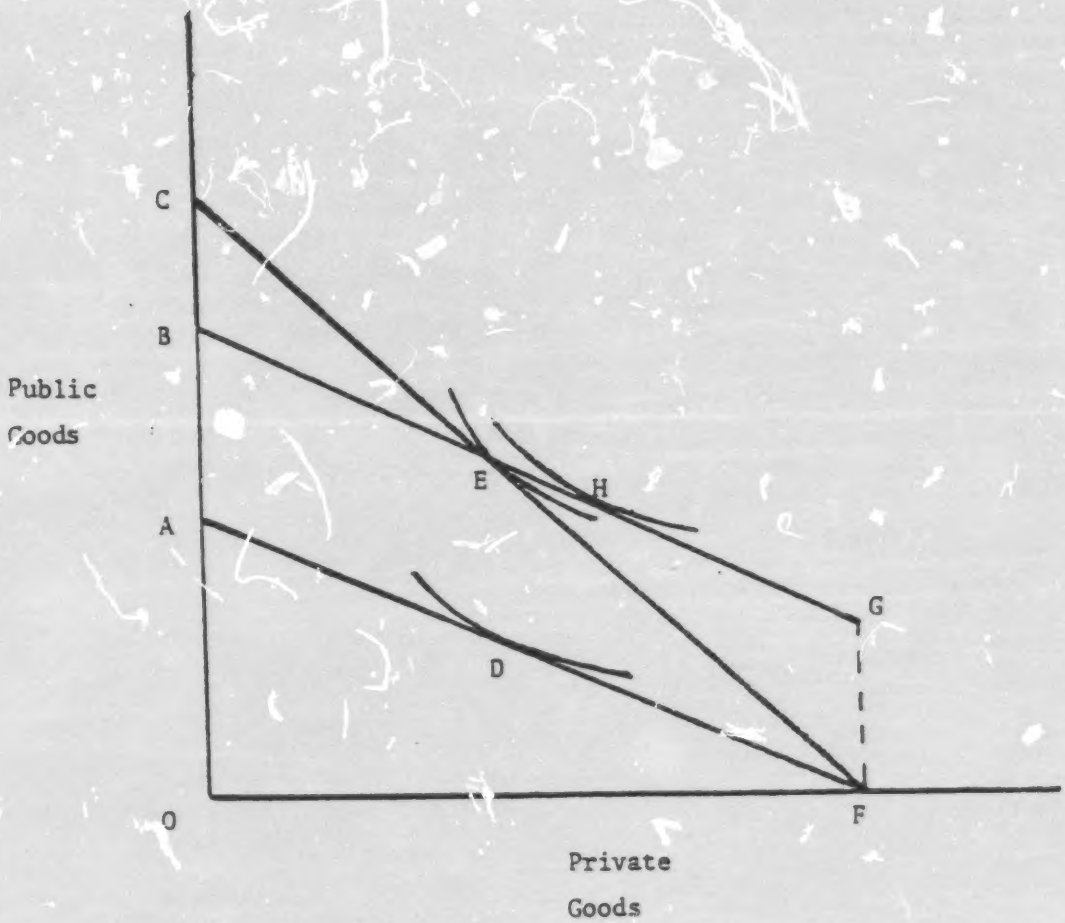
Theory of Inter-Governmental Grants and Application to New Hampshire

The expenditure impact of state and federal non-matching grants to localities in support of various local services have been studied extensively in the literature on local public finance [see, for example, Bishop (1964), Hardy (1976), Mieskowski and Oakland (1979), Renshaw (1966) and Wilde (1968)]. Matching aid has also received attention in the literature, although not as extensively [see for example Jurion (1979) and Mieskowski and Oakland (1979)].

In its simplest form the analysis of the expenditure effects of grants-in-aid programs take either the local governmental unit or a representative or deciding voter in the locality as an expenditure optimizer, dividing a given budget between the private and public sectors, and further dividing expenditures within the public sector in a fashion which depends on local or individual preferences, local or individual fiscal capacity, or spending power, and the effective prices of all goods to the locality or deciding voter. Special attention must be paid to proper model specification when the grant program is strongly dependent on local characteristics. [see Broida (1977)] or when cost considerations are entered into the model. In the absence of these two features, the model can be specified as a single demand equation, with the arguments reflecting fiscal capacity, relative prices of public service, and special characteristics of the community which might affect taste for the public in question.

The manner in which intergovernmental aid is entered into the demand equation depends upon whether the aid is matching at the margin or not. Non-matching aid affects only the fiscal capacity of the community, and is usually entered as a separate argument in the demand equation because it is not a priori clear that a dollar of aid is perceived by voters in the town to be the same as a dollar of personal income. On the other hand, matching aid alters the marginal price of local services by reducing the tax cost per dollar of local expenditures by the marginal rate of matching. Although matching aid has an income effect, it is not correct to enter the amount of matching aid in the demand equation as a fiscal capacity variable.

Basic economic theory indicates that the dollar-for-dollar impact of matching aid in local expenditure should be greater than that of non-matching aid. This is because matching aid has both a substitution and income effect, while non-matching aid has only an income effect. This is shown diagramatically in Figure I on the next page. AB represents the community or median voter's budget line in the absence of any grant program under the assumption of only one public good. Without any outside aid, the community would select point D as its optimum. CF represents the community budget line in the presence of a matching grant program where the matching rate is equal to CA/AO. A new equilibrium is achieved at point E. Notice that the community response to the matching grant is to increase its expenditure on the public good. Expenditures on private goods are shown to decrease in response to the matching aid, however this is not necessarily the case. The amount of aid received by the community under the matching grant program is equal to GF. Line BG represents the budget line of a community receiving the amount GF in the form of non-matching aid. The difference between the two responses is equal to the vertical distance between points E and H in the diagram. In essence, the movement from point D to point H represents the community's income-effect response to the aid received. This is the total response to intergovernmental aid when it comes in a non-matching form. Matching aid has the same income effect, but also results in a substitution effect equal to the vertical distance between point H and E.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The analysis of the previous paragraph is generally supported by empirical testing. In one of the more sophisticated empirical analyses to date on the subject, Follain (1979) found that education grants with a 1:1 matching formula are indeed more stimulative than unconditional education grants. However, the differential impact was found to be small. It may be expected that the differential impact of a matching grant program would increase as the rate of local matching decreases. As it is not inconceivable for a DPE formula to match the expenditures of relatively poor districts at the rate of 4:1, one expects that the differential impact of DPE over Foundation Aid could be substantial.

Municipal Overburden

In early studies comparing local government spending on municipal service with spending on education, it was found that suburbs tend to specialize in education, devoting a high proportion of their budget to school services. In contrast, large cities were found to devote the bulk of their revenues to run municipal functions.[3] The concept of municipal overburden was developed to explain this contrast.[4]

Municipal overburden refers specifically to costs imposed on residents of municipalities and borne through the local tax system, which are associated with characteristics of the municipality such as high proportions of poor and aged populations, high rates of fire and crime, a large non-resident working populace which relies upon city services such as road repair, and higher than normal cost for public health and sanitation. It was thought that the observation of low proportions of school expenditures in cities might result from the burden on city taxpayers associated with these costs.

The burden associated with these costs was initially measured by the level of the total or non-school tax rate. However, it was soon pointed out that that this measure was misleading because it failed to distinguish between communities with varying ability to pay. It was also pointed out that differences in tax rates might reflect differences in local taste as much as differences in local burdens. In light of these criticisms, new measures have been devised which attempt to abstract from fiscal capacity and taste difference, but which still measure the relative fiscal stress resulting from characteristics [see Miner and Sacks (1981), Sacks (1981), and Reschovsky and Knickman (1976)].

The proposition tested in Chapters III and V is that municipal overburden is a determinant of school expenditures in New Hampshire. The methodology we employ for econometrically measuring municipal overburden and testing its impact on school

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[3]In an early study of this phenomenon, Campbell and Sacks (1967) found that expenditures on education comprised 31.3 percent of total expenditures in central city areas and 53.7 percent of total expenditures in outside central city areas. Conversely, noneducational expenditures constituted 68.7 percent of total expenditures for central cities and 46.3 percent for areas outside of central cities.

[4]See Knickman and Reschovsky (1981) and Jordan and Cambron-McCabe (1981) for a review of the municipal overburden concept and its measurement. Also see studies by Dommel and Nathan (1978), U.S. Congressional Budget Office (1978), Touche, Ross and Company (1979), and the U.S. Department of Housing and Urban Development (1979).

spending is described in Chapter IV. We have developed a less sophisticated measure of municipal overburden for use in the analysis of survey responses in Chapter III. For that purpose we used a simple index of factors commonly associated with overburden: population, property density, and fraction of population receiving welfare. The index was created by assigning a value between 0 and 1 to each municipality for each of the three variables, and summing the three values. The value assignment was made by dividing the value of each of the three variables for each town by the maximum value for all towns. Hence, the town with the highest population received a value of 1 for that variable, etc. The highest possible index was 3.0, but the highest index value attained was 2.43 assigned to Manchester (New Hampshire's largest city). The next higher value was 1.76 and the mean of the index was 0.30.

The test of the relevance of the municipal overburden concept in New Hampshire is interesting because New Hampshire is a largely rural state. The concept of urban fiscal stress was developed to explain school spending patterns in large cities like New York and Baltimore. If the concept applies in a state like New Hampshire, where the largest city had a population of about 90,000 in 1980, then it most likely applies in all states, and should be given consideration as a factor in school aid formulas in all states.

CHAPTER III

QUESTIONNAIRE ANALYSIS

Our questionnaire was designed to elicit quantitative estimates of the impact of intergovernmental grants to school districts and municipalities on school spending in New Hampshire and the degree to which there is interaction between the school and municipal budget. We attempted to obtain responses for all school districts associated with municipalities not involved in a cooperative arrangement[1] (hereinafter referred to as "included school districts") except for the Newington and Waterville Valley school districts.[2] For each of the included districts we attempted to obtain responses from the school superintendent and from one school board member and one municipal budget committee member (in cities) or selectman (in towns). Where superintendents worked for more than one included school district, they were asked to complete a questionnaire for each of the included school districts they worked for. Responses were received from 42 superintendents, representing 79 out of the 132 included school districts. In comparison, the response rate from budget committee members was not as good. Responses were recieved from nine budget committee members or selectmen and 23 school board members.

Responses from each of the three groups were tabulated separately and

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[1] 106 of New Hampshire's municipalities participate in a cooperative school district for all of their pupils or for their middle and/or high school pupils. School spending decisions for pupils from such municipalities are made by school boards with representation from several municipalities. Respondents in our pre-test found it very difficult to respond to our questionnaire for municipalities involved in such cooperative arrangements. Hence, school districts associated with such municipalities were dropped from the study.

This exclusion is actually justifiable in theory. The spending decisions of cooperative school districts are made on the basis of a somewhat complicated political process. This process weighs the interests of the various school districts in the coop in ways which would be difficult to model. An attempt could be made to model this process econometrically. However, the development of such a model is beyond the scope of the present analysis.

[2] Newington and Waterville Valley were excluded from both our questionnaire analysis and the econometric analysis reported in Chapter V, because they are outliers on both equalized value per pupil and on school spending. The state average equalized property valuation per pupil was $139,684 in 1980. However, Newington's equalized valuation per pupil was $3,257,811 (twenty-three times the state average) and Waterville Valley's was $1,617,026 (12 times the state average). The school district with the third highest equalized valuation per pupil was Moultonboro, with a figure of $605,449. It was decided that Newington's and Waterville Valley's spending decisions would not be representative of even the so-called "wealthy" school districts in our sample. More specifically, any estimate of the normal relationship between school spending and our explanatory variables would probably be obscured by the inclusion of these two school districts.

compared. The response patterns for each of the three groups were highly similar. Therefore, it was decided to pool all the responses for reporting purposes.

In our tabulations, we broke responses out along three dimensions: wealth per pupil, median family income, and our municipal overburden index. For each dimension, respondents were placed in a "high," "middle," or "low" group, depending on whether they were answering for a municipality in the highest, middle, or lowest third of municipalities represented in the survey. The group cutoffs for each dimension were as follows:

Group	Cutoff	Number of Respondents
Low wealth	Equal per pupil ≤ $113,080	38
Middle wealth	Equal per pupil between $113,080 and $140,618	37
High wealth	Equal per pupil ≥ $140,618	36
Low income	Median family income ≤ $14,659	37
Middle income	Median family income between $14,659 and $16,743	37
High income	Median family income ≥ $16,851	37
Low overburden	Overburden index ≤ .304	36
Middle overburden	Overburden index, between .304 and .531	37
High overburden	Overburden index ≥ .531	38

It is worth noting that these groups do not overlap substantially (i.e., that the three groupings partition the sample differently). In particular, the wealth and income cutoffs shown above do not create similar subgroups. This is because wealth per pupil and median family income are not highly correlated in New Hampshire. We present below a cross tabulation of the wealth and income groupings. If wealth and income partitioned the sample into much the same groups, almost all the frequencies would be in the diagonal elements of the matrix. This is clearly not the case. For example, notice that 10 responses represent school districts

Cross Tabulation of Wealth and Income Groupings

	Low Income	Middle Income	High Income
Low wealth	16	10	10
Middle wealth	9	19	9
High wealth	12	8	18

that are in the upper right-most cell, high income and low wealth. School districts in this cell have a relatively affluent populace, but little or no industry and commercial activity. Notice also that there are 12 school districts with high wealth and low income. A large part of the tax base in these school districts would be in commercial and/or industrial property.

The questionnaire was divided into two parts. (A copy of the questionnaire is provided as Appendix I to this report.) Section A is devoted to assessing the short-run and medium-run impact of Business Profits Tax (BPT) and other non-foundation state grant programs on school budgets and on actual school expenditures.[1] More specifically, the questions elicited estimates of any changes in school district budgets and expenditures that would be likely to result from a hypothetical loss of BPT school tax aid and BPT and other municipal aids. Section B requested estimates of spending responses to both the hypothetical loss and hypothetical full funding of New Hampshire's foundation aid program.

The questions in both sections were asked with respect to three time frames: immediate impact, one year later (short-run impact) and six years later (long-run impact). So as to minimize the degree of speculation involved in answering these questions, we always asked the respondent for an opinion regarding budget or expenditure changes for the 1981-82 school year. Hence, we situated the hypothetical change in BPT and foundation aid at three different points in time (summer of 1981, summer of 1980, and sometime in 1975) to get the immediate, short-run and long-run responses.

As indicated in Chapter I, the state distributes monies from the Business Profits Tax to municipalities in order to reduce local taxes. About 2/3 of these distributions are intended to reduce the school tax. The total state BPT distribution for this purpose in 1980 was $22.9 million. This represented about $135,500 per school district, or about about 6% of total school district expenditures in New Hampshire. The remaining 1/3 of BPT distribution, amounting to $14.3 million in 1980, is intended to lower municipal and county taxes. (Municipalities also recieve distributions from a number of other state taxes designed to reduce local property taxes amounting to $22.5 million in 1980*.)

Part A of the questionnaire asks about the effect of the hypothetical loss of both of these types of BPT distributions (to school districts and to municipalities) on school budgets and expenditures. Questions 1-4 concern BPT distributions to school districts, while questions 5 and 6 concern state distributions to municipalities.

ANALYSIS OF QUESTIONS OF BPT DISTRIBUTIONS TO SCHOOL DISTRICTS

The first question we asked was as follows:

Q1. Suppose you learned today that the school share of the B-P tax for your community was permanently cut to zero starting in 1981-82.

a. We assume your 1981-82 budget as previously adopted would remain unchanged, and the tax rate would increase by an amount sufficient to compensate for the lost B-P tax aid-- is this correct? Yes___ No___

If "No" please explain

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[1] Questions were also asked about the effects of non-foundation state aid distributions on local tax rates. These questions were asked as checks on the budget and expenditure reduction responses, and are not analyzed here.

* Interest and Dividends, Rooms and Meals, Savings Bank and Railroad Taxes

TABLE I

QUESTION # 1a

1. Suppose you learned <u>today</u> that the school share of the B-P tax for your community were permanently cut to zero starting in 1981-82.

   a. We assume your 1981-82 budget as previously adopted would remain unchanged, and the tax rate would increase by an amount sufficient to compensate for the lost B-P tax aid -- is this correct?

   Yes____ No____

	No	Yes
Low wealth	22.2%	77.8%
Middle wealth	24.3%	75.7%
High wealth	13.2%	86.8%

sig. = 0.44

Low income	35.1%	64.9%
Middle income	21.6%	78.4%
High income	2.7%	97.3%

sig. = 0.00

Low overburden index	23.7%	76.3%
Middle overburden index	10.8%	89.2%
High overburden index	25.0%	75.0%

sig. = 0.24

Overall	19.8%	80.2%

b. In your opinion, would your school board vote to decrease its 1981-82 expenditures to compensate for some or all of the lost B-P tax aid?
Yes ___ No ___
If "Yes" please estimate by how much: $_____
Please specify which programs you would eliminate or cut back.

Notice that Q1a refers to the school budget, while Q1b refers to school expenditures. We asked this question in this manner because of the timing of the budgetary and distribution decision announcements in New Hampshire. Municipal and school budgets are set in town meetings in March of each year or by city councils by the end of the fiscal year and submitted to the State Department of Revenue Administration (DRA) shortly therearter. However, the actual distributions to each municipality and each school district are not announced by the State Treasurer until July or August. Hence, municipalities and school districts enact and submit their budgets on the basis of their own predictions of BPT and foundation aid distributions for the following year. After the municipal and school district budgets are submitted and actual BPT and foundation aid distributions are announced the DRA sets the local tax rate by deducting the dollar amount of each community's total distributions from the value of the local and school budgets that it enacted and dividing by the assessed valuation of the municipality. Therefore, if the actual distributions to a municipality or school district were lower than its prediction, the tax rate computed by the DRA would be higher than expected. The municipality could avoid an unexpectedly high school tax rate for the current year only by emergency budget action.

We expected most respondents to say that the current year's budget would not be changed in response to the loss of BPT aid because of the radical political action that would have to be taken. Rather, we thought that school districts would cut spending in the current year, so as to carry monies over to the following year for tax reduction. Hence we predicted that virtually all respondents would answer "Yes" to both questions 1a and 1b.

Our tabulation of responses to Q1a is given in Table I. Surprisingly, 19.8% of all respondents answered"No" to this question. It is even more interesting that a full 34.0% of respondents from low income districts responded in the negative, while only 2.7% of the respondents from high income districts (one respondent out of 37) answered "No." Low income municipalities appear to be very sensitive to sudden tax rate changes, sensitive enough to call a special meeting to reduce the school budget so as to avoid an unexpected tax increase. A chi square test indicates that the responses on this question were conditioned by income at the .002% level of confidence (reported in Table I as "sig. = 0.00".).

Respondents from high wealth school districts were less likely than those from low and middle wealth school districts to answer this question in the negative, although wealth does not appear to differentiate respondents on this question as significantly and continuously across groups as does income. The municipal overburden index appears to be completely uncorrelated with response patterns on this question.

The response to Q1a underscores an important theme in the school finance literature: the choice of a variable which measures fiscal capacity. As will be seen below, it is sometimes income and sometimes wealth that is the primary factor distinguishing response patterns, and at times both of these factors appear to be operative simultaneously. Clear determination of the separate effects of income and wealth on school spending patterns would require the specification of a model

that is beyond the scope of our present analysis. To the extent that variations in school district property wealth are reflected in a different education tax price, these influences are separately assessed in the econometric analysis of chapters IV and V.

Our tabulation of Yes-No responses to Q1b is given in Table II. As expected, a substantial fraction of respondents, 34.2%, indicated that the loss of BPT school aid would result in lower school spending during the year of the loss. We conclude, on the basis of the responses to Q1a andlb, that about 14% (34.2%-19.8%) of the respondents thought as we did; i.e., that no immediate budgetary action would be taken, but that spending for the current year would be curtailed so as to relieve upward pressure on the tax rate for the following year. As with Question 1a, the responses are differentiated on the basis of both wealth and income (but not municipal overburden), with income the more significant of the two.

As part of Question 1b, we asked the respondents to estimate how much of an impact the loss of BPT school aid would have on the current year's school spending. In analyzing the responses to this question and all subsequent questions requesting estimated dollar impacts, we divided the estimated dollar impact by the amount of the relevant state aid in the district, and cross-tabulated the resulting fraction with wealth, income and our municipal overburden index. This fraction represents a percent response of school spending to a change in the amount of aid recieved. We expected that the magnitude of the responses would increase with the duration of the hypothetical change in aid. As indicated below, this expectation was borne out.

The immediate fractional response to the hypothetical loss of BPT school aid is reported in Table III. Overall, the average reduction in school expenditures was estimated to be 17% of the lost BPT school aid.[3] As might be expected from the frequency analysis, median family income in the district was the principal determinant of the magnitude of the immediate cut in school spending resulting from lost aid. Respondents from low income communities estimated the immediate impact at 27% of the lost aid, while high income communities were predicted to reduce expenditures immediately by only 12%.

Tables IV - VI report the estimated short-run and long-run responses to the hypothetical BPT school aid loss. Overall 51.4% of respondents indicated that there would be a short-run budgetary response, with the average short-run response predicted to be 28% of BPT school aid. As expected, both of these figures are larger than the corresponding immediate response predictions.

Also as expected, the average predicted long-run budget reduction (35% of BPT school aid) was greater than the predicted short-run response. Curiously, however, the long-run responses appear to be dominated by community income, while the short-run responses appear to be dominated by wealth. This is added evidence of the need for further study of the interaction of these two variables with school spending.

Municipal overburden appears with significance in Table IV, but this seems to be a random event, as it does not prove to be a significant factor in the analysis of any other item in this section of the questionnaire.

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[3]Respondents who answered "No" to the lead-in for this question were included as "zero for purposes of the analysis reported in Table III. The average fractional reduction for those who answered "Yes" on this question was substantially higher than 17%.

TABLE II

QUESTION # 1b

1. Suppose you learned today that the school share of the B-P tax for your community were permanently cut to zero starting in 1981-82.

   b. In your opinion, would your school board vote to decrease its 1981-82 expenditures to compensate for some or all of the lost B-P aid? Yes___ No___

	No	Yes
Low wealth	55.6%	44.4%
Middle wealth	64.9%	35.1%
High wealth	76.3%	23.7%

sig. = 0.17

Low income	51.4%	48.6%
Middle income	70.3%	27.7%
High income	75.7%	24.3%

sig. = 0.07

Low overburden index	68.4%	31.6%
Middle overburden index	62.2%	37.8%
High overburden index	66.7%	33.3%

sig. = 0.84

Overall	65.8%	34.2%

TABLE III

QUESTION # 1b

1. Suppose you learned <u>today</u> that the school share of the B-P tax for your community were permanently cut to zero starting in 1981-82.

   b. In your opinion, would your school board vote to decrease its 1981-82 expenditures to compensate for some or all of the lost B-P tax aid?

   If "Yes" please estimate by how much: $_____.

		Expenditure reduction as a fraction of BPT school aid
sig. = .43	Low wealth	0.23
	Middle wealth	0.15
	High wealth	0.13
sig. = .06	Low income	0.27
	Middle income	0.11
	High income	0.12
sig. = .87	Low overburden index	0.19
	Middle overburden index	0.17
	High overburden index	0.15
	Overall	0.17

TABLE IV

QUESTION # 2a

2. Suppose you found out one year ago that the school share of B-P tax aid was to be permanently discontinued.

   a. In your opinion, would this reduce the 1981-82 capital or operating budget? Yes___ No___

	No	Yes
Low wealth	36.1%	63.9%
Middle wealth	45.9%	54.1%
High wealth	63.2%	36.8%

sig. = 0.06

Low income	45.9%	54.1%
Middle income	45.9%	54.1%
High income	54.1%	45.9%

sig. = 0.72

Low overburden index	55.3%	44.7%
Middle overburden index	59.5%	40.5%
High overburden index	30.6%	69.4%

sig. = 0.03

Overall	48.6%	51.4%

TABLE V

QUESTION # 2a

2. Suppose you found out one year ago that the school share of B-P tax aid was to be permanently discontinued.

In your opinion, would this reduce the 1981-82 capital or operating budget?

If "Yes" please estimate by how much: Operating: $_____

Capital: $_____

		Capital + Operating Expenditure Reduction as a Fraction of BPT School Aid
	Low wealth	.34
sig. = .06	Middle wealth	.31
	High wealth	.17

	Low income	.29
sig. = .63	Middle income	.31
	High income	.23

	Low overburden index	.26
sig. = .13	Middle overburden index	.20
	High overburden index	.37

Overall .28

TABLE VI

QUESTION # 3a

3. Now suppose the 1980 school share of the B-P tax had been permanently discontinued in 1975. What effect do you think this would have had on your 1981-82 school budget?

   a. 1981-82 school budget would have been lower by $_____.

sig. = .63	Low wealth	.37
	Middle wealth	.40
	High wealth	.29

sig. = .01	Low income	.37
	Middle income	.52
	High income	.16

sig. = .92	Low overburden index	.38
	Middle overburden index	.33
	High overburden index	.3[illegible]

Overall .35

TABLE VII

QUESTION # 1b

1. Suppose you learned today that the school share of the B-P tax for your community were permanently cut to zero starting in 1981-82.

   b. Please specify which programs you would eliminate or cut back.

	Number of Times Mentioned
Staff cuts	14
Athletics	11
Transportation	8
Music	7
Equipment	6
Teacher Aides	6
Increase Class Size	5
Art	5
Maintenance	5
Extracurricular	4
Supplies	4
Administration	3
Guidance	3
Library/Audio Visual	3
Repairs	3
Hot Lunch	2
Special Education	1
Texts	1

TABLE VIII

QUESTION # 4

4. In your opinion, if the B-P tax aid were paid directly to the school district, would it have made a difference in your 1981-82 school budget?
Yes____ No____

Please explain.

		No	Yes
Sig. = .06	Low wealth	50.0%	50.0%
	Middle wealth	64.9%	35.1%
	High wealth	76.3%	23.7%
Sig. = .76	Low income	59.5%	40.5%
	Middle income	67.8%	32.4%
	High income	64.9%	35.1%
Sig. = .67	Low overburden index	63.2%	36.8%
	Middle overburden index	51.4%	48.6%
	High overburden index	77.8%	22.2%
	Overall	64.0%	36.0%

As part of Question 2, we asked respondents to break out their estimated budget reduction by capital and operating accounts. Of the total estimated budget reductions, about one-fifth was estimated to come from the capital account. We believe that this primarily represents postponement of capital expenditures. However, this cannot be tested because the capital-operating breakdown was not requested in Question 3.

In addition to asking about dollar amounts, we also asked which programs the loss of BPT school aid would be most likely to affect. Not surprisingly, most expenditure cuts were predicted to take the form of "staff cuts" or "increase in class size." "Staff cuts" were mentioned 14 times in response to Question 1, while "Increase in class size" was mentioned 5 times. We believe that these are substantially the same responses. The next "programs" to be mentioned were athletics (11times), transportation (8times), music (7times), followed by teacher aides and purchase of equipment (6 times each), and art and maintenance (5 times each). The complete list of responses to this question is given in Table VII. When asked again in the context of the short-run and long-run budgetary responses, a similar pattern of program cuts was mentioned. Hence, those responses are not reported here.

Question 4 asked whether New Hampshire's practice of distributing BPT school aid formally to municipalities affects school budgets. ("In your opinion, if the B-P tax aid were paid directly to the school district, would it have made a difference in your 1981-82 school budget?") While BPT school aid is actually used to reduce the school tax rate, it does not appear as a revenue item on school district income statements. In theory, this should make no difference on school budgets because the tax bill associated with the proposed budget is known to voters at the time the proposed budget is entered for discussion. Yet 40 of 115 respondents answered the question in the affirmative. (The complete tabulation of responses is given in Table VIII.) If these responses are correct, this is a clear indication that information about and perceptions of intergovernmental aids play a large role in their effectiveness. In particular, these responses indicate that BPT school tax aid may not have as much of an effect on local school expenditure decisions as it might if voters were more aware of its existence. However, we feel that a firm conclusion on this issue could not be drawn without further study.

ANALYSIS OF QUESTIONS ON AID TO MUNICIPALITIES

Questions 5 and 6 of Section A pertain to the hypothetical loss of state grants to municipalities intended to reduce the municipal portion of the local tax bill. These questions were designed to measure the extent to which municipal budget pressures would be reflected in lower school spending.

As indicated in Chapter II, increases in what may be viewed as uncontrollable municipal expenditures may be expected to depress spending levels for other categories of consumption, both public and private. This is a fundamental premise of the theory of municipal overburden. Whether or not the theory of municipal overburden is reasonable, the effects of municipal overburden on educational spending will be observed only if there is a cross-over effect between these two local budgets. Questions 5 and 6 are designed to test whether such a cross-over effect is observable.

The responses to these questions are tabulated in Tables IX -XII. 62.2% of the respondents felt that there would be a short-run effect on school budgets if the municipality lost all state aid, while 54.1% felt there would be a long-run effect. Overall, the average short-run impact was estimated to be 18% of the lost

TABLE IX

QUESTION # 5

5. In 1980-81, the total property tax in your community was lowered due to state grants totaling $_____, from the room-meals, interest-dividends, and B-P municipal and county shares.

   a. In your opinion, if these aids had been permanently discontinued in 1980, do you think this would have had an effect on the 1981-82 school budget? Yes____ No____

	No	Yes
Low wealth	19.4%	80.6%
Middle wealth	45.9%	54.1%
High wealth	47.4%	52.6%

Sig. = .02

Low income	29.7%	70.3%
Middle income	32.4%	67.6%
High income	51.4%	48.6%

Sig. = .11

Low overburden index	44.7%	55.3%
Middle overburden index	43.2%	56.8%
High overburden index	25.0%	75.0%

Sig. = .15

Overall	37.8%	62.2%

TABLE X

QUESTION # 5

5. In 1980-81, the total property tax in your community was lowered due to state grants totaling $_____, from the room-meals, interest-dividends, and B-P municipal and county shares.

a. In your opinion, if these aids had been permanently discontinued beginning in 1980, do you think this would have had an effect on the 1981-82 school budget?

If "yes" please estimate the effect on the 1981-82 school budget.

		Estimated school budget reduction as a fraction of total municipal aid
Sig. = .01	Low wealth	.33
	Middle wealth	.14
	High wealth	.11
Sig. = .50	Low income	.21
	Middle income	.21
	High income	.14
Sig. = .08	Low overburden index	.16
	Middle overburden index	.11
	High overburden index	.27
	Overall	.18

TABLE XI

QUESTION # 6

6. In your opinion, if your community had received no state grants under these programs since 1975, do you think this would have had an effect on the 1981-82 school budget? Yes____ No____

		No	Yes
Sig. = .07	Low wealth	30.6%	69.4%
	Middle wealth	56.8%	43.2%
	High wealth	50.0%	50.0%

Sig. = .24	Low income	37.8%	62.2%
	Middle income	43.2%	56.8%
	High income	56.8%	43.2%

Sig. = .11	Low overburden index	57.9%	42.1%
	Middle overburden index	45.9%	54.1%
	High overburden index	33.3%	66.7%

Overall	45.9%	54.1%

TABLE XII

QUESTION # 6

6. In your opinion, if your community had received no state grants under these programs since 1975, do you think this would have had an effect on the 1981-82 school budget?

If "yes,"

1981-82 school budget would have been lower by $_____.

	Estimated school budget reduction as a fraction of total municipal aid
Low wealth	.38
Middle wealth	.13
High wealth	.37

Low income	.37
Middle income	.18
High income	.31

Low overburden index	.21
Middle overburden index	.36
High overburden index	.26

Overall .27

municipal aid, while the long-run effect was estimated to be 27%. Notice that, although fewer respondents indicated that there would be a long-run response than indicated a short-run response, the average long-run response was predicted to be the greater of the two. Apparently there are three types of respondents: those for whom no impact was predicted at any time, those for whom there would be an initial impact from which the community would "recover," and those for whom there would be a growing response. Oddly, the growing responses appear to be concentrated in the high wealth and high income groups. It is not clear to us why this would be the case, or why high wealth and high income communities would have a greater overall average response to the loss of municipal aid than communities with middle wealth and income.

Notice that the average long-run impact was estimated to be only 8% (35%-27%) less than the estimated fractional impact of loss of school aid. This indicates quite a bit of substitutability between local public budgets and leads one to conclude that, if municipal overburden exists in New Hampshire, it would most likely have a depressive impact on school budgets. However, in the long run, communities with a high overburden index do not show a greater than average budgetary response to the loss of municipal aid.

In summary, one concludes from the responses to questions 5 and 6 that the interplay of the two local public budgets is quite substantial but also quite complex. The initial indications are (1) that this interplay is effective throughout the range of income and wealth, and (2) that municipal overburden may not substantially affect the way intergovernmental grants are spent in New Hampshire.

ANALYSIS OF QUESTIONS ON FOUNDATION AID

Section B asks about the impact of New Hampshire's foundation aid program on school spending. We asked the respondents to comment on two hypothetical scenarios: (1) deletion of all foundation aid grants to school districts, and (2) full funding of New Hampshire's foundation aid program.

New Hampshire's foundation aid program is a typical one in that it is intended to bring school tax effort and school spending up to specified minimum levels (14 mils and 14 mils x the average state equalized property valuation per pupil, respectively). However, it is atypical in that the program is funded at only about 10% of the authorized dollar level. The actual funding level is decided on a biennial basis. Full funding of New Hampshire's foundation aid program would have generated $31.6 million in the 1981 school year, whereas the actual amount distributed under this program in 1981 was $3.76 million. As a result a relatively small number of school districts receive foundation aid support (35 out of 169 districts in 1981). For those districts receiving foundation aid, the amounts received are about equal to the amount that these communities receive in Business Profits Tax school aid. Therefore, its deletion would not depress school spending much. On the other hand, one would expect that full funding for the indefinite future could have substantial effects on school spending.

Because these funds are targeted to communities that have low levels of property wealth per student, it was expected that foundation aid would show at least as much of an impact on local educational spending as does Business Profits Tax school aid. The responses to Questions 1-3 of Section B bear this reasoning out.

Only 17 of the respondents in the sample were from school districts that received foundation aid. Of these 17, none indicated that the loss of foundation aid would probably lead to an immediate budget reduction, while 12 of these respondents felt that there would be a short-run budgetary reaction. As expected the size of the school spending reaction was quite substantial: 32% of the lost aid immediately, 46% in the short-run, and 64% in the long-run. Almost all of the expenditure reduction was predicted to come from operating expenditures (27% immediately and 42% in the short-run). No analysis of variance was attempted on these questions because the cell size would have been too small.

Questions 4-6 were the only questions in the survey which asked about a hypothetical increase in state aid. Question 4 asked about the short-run reaction to the hypothetical full funding of the state's foundation aid formula. Respondents were asked to estimate how much higher their expenditures would have been if the formula were fully funded. Of the 111 responses, 51 represented school districts that would have received foundation aid if the formula were fully funded and 29 of these indicated that this would have increased their 1980-81 school budget. The average increase for these respondents was predicted to be 22% of the full funding amount.

There seems to be a ratchet effect operating here. Apparently, respondents felt that the short-run spending responses to an increase in school aid would be less dramatic than the short-run responses to a decrease. This number is suspect, however, because respondents indicated that taxes would be likely to decrease by only 52% of the full funding amount, leaving 26% of the increase in state aid unaccounted for. Yet there are reasons to believe that the upward spending response to increased aid may not be as dramatic as the downward spending response

to decreased aid. First, a large part of the increased aid would be allocated to communities less in need of the aid than those currently receiving it. It may also be that school officials feel the current educational offerings to be satisfactory with little need for improvement even if more funds become available. However, this is not to say that new "needs" would not actually be discovered when and if new funding became available.

The capital-operating breakdown in response to Question 4 lends support to the existence of the ratched effect mentioned above. According to the respondents, 7.4% of the increased aid would have been applied to capital spending, while 17.8% would have been applied to operating expenditures. This is a considerably more even split between capital and operating expenditure reactions than was predicted in response to decreased aid, and it would seem to indicate that the current level of operating expenditures is viewed as critically necessary, while additional operation expenditures would be less critical.

Table XIII breaks down the response estimates requested in Question 4 by income and the municipal overburden index. (Property wealth is not used as a contingency variable for this question because only communities with relatively low property wealth would be eligible for foundation aid if it were fully funded.) Interestingly, community income does not appear to significantly differentiate the response patterns on this question, although it was expected to. As usual, the municipal overburden index has no significant effect.

Question 6 is another test of the cross-over effect between school and municipal budgets, except in the opposite direction from Questions 5 and 6 of Section A. Rather than asking about the effect of municipal budget pressures on the school budget, Question 6 asks about the effect of school tax relief on municipal spending. The responses, however, were much the same. Question 6 was worded as follows:

> 6. In your opinion, would full funding of Foundation Aid have affected municipal spending decisions in 1981-82? Yes___ No___
>
> Please explain.

Of the 51 responses for school districts that would have been affected by the full funding of New Hampshire's foundation aid formula, 25 indicated that the increase in foundation aid would affect municipal spending decisions. Although respondents were not asked to venture an estimate as to the extent of this effect, the responses support our previous conclusion of a substantial cross-over effect between the two local budgets.

TABLE XIII

SECTION B

QUESTION # 4

4. In your opinion, if the Foundation Aid had been fully funded in 1980-81, would your 1981-82 expenditure (capital or operating) levels have been higher? Yes____ No____

   a. If "yes" please estimate by how much higher: $_____
   $_____

		Increase in school spending as a fraction of increase in foundation aid
Sig. = .64	Low income	.26
	Middle income	.21
	High income	.18

Sig. = .55	Low overburden index	.25
	Middle overburden index	.17
	High overburden index	.24
	Overall	.22

CHAPTER IV

ECONOMETRIC METHODOLOGY

Our econometric analysis is based upon the median voter model of local government behavior. This model assumes that local spending decisions can be analyzed as if they are made by a fictional voter who has the median characteristics of the community (the median voter). Substantial support for the median voter model has been provided by Bergstrom and Goodman (1973), Inman (1978), Deacon (1978) and Lovell (1978).

In effect, the demand for local public services is assumed to be that of the community's median voter. The median voter's demand is determined by traditional variables such as income and price, and by "taste" variables particular to models of public choice, such as percent of families with children in private schools. Other variables can be introduced to reflect lags in adjustment.

Variables used in the Analysis

The demand variables employed in the present analysis are:

ESUD	=	educational service units provided in the district in school year 1980-81.
OPEXP	=	operating expenditures per pupil in school year 1980-81.
MFI	=	estimated median family income in the school district in 1979.
TP	=	marginal dollar tax price of an educational service unit to the district resident with the median house value in 1980.
BPSC	=	Business Profits Tax distribution (school share) per capita to the school district in 1980.
FAC	=	Foundation Aid per capita to the school district in 1981.
FEDC	=	federal aid per capita to the school district in 1981.
PRIVC	=	fraction of school age children in the school district enrolled in private schools in 1980.
GROW	=	the rate of growth of school district pupil population over the years 1978-1980 (ADMA in 1980 ÷ ADMA in 1978).

The variable ESUD is unobservable because there is no consensus on what constitutes a "unit" of education. However, it is useful to employ this variable in the derivation of the estimated equations because it enables the imposition of alternative assumptions about cost differences in the delivery of education.

OPEXP is an observable variable, equal to ESUD multiplied by the dollar cost of an educational service unit. The dollar cost of an ESU is discussed along with the variable TP on the next page.

The variables MFI, BPSC, FAC and FEDC all reflect fiscal capacity. MFI represents the median voter's ability to pay for all goods and services, public or private. The actual data on income in New Hampshire are from the 1970 census. However, estimates of income by municipality are available for years as late as 1979. We used the estimated 1979 MFI figure as a proxy for the median voter's 1980 income. 1980 is the year in which operating expenditure decisions were made for the 1980-81 school year. BPSC, FAC and FEDC all affect the community's ability to pay for education. The total business profits school share, foundation aid amount and federal grants received are divided by 1980 school district population because the fiscal impact of each of these aids on the median voter's budget is in proportion to the per capita aid distribution.

TP reflects the marginal dollar cost of a unit of education to the median voter. There are two multiplicative components to TP, the marginal dollar tax price of one dollar's educational spending (TP_A) and the marginal dollar cost of an educational service unit (TP_B). Therefore, one can write:

$$TP_A = \frac{(\Delta\$ \text{ paid in education tax})}{(\Delta\$ \text{ spent on education per pupil})} \times \frac{(\Delta\$ \text{ spent on education})}{(\Delta \text{ ESU provided})}$$

$$= TP_A \times TP_B$$

The median voter's marginal dollar tax price for educational spending in each school district is given by:

$$TP_A = \frac{\text{Median House Value in the district}}{\text{Total Equalized Property Value per Pupil in the district.}}$$

Notice that TP_A decreases when the ratio of non-residential to residential property value in the community decreases, and increases as the ratio of median to average residential property value in the community increases. An illustrative example, given below, will clarify this notion of tax price.

Assume that community A has 100 residential units, each valued for tax purposes at $50,000, and no non-residential property. Hence, the total equalized property value in the community is $5,000,000. The cost to the median taxpayer of $1. of school expenditures is $.01, and the cost of $1. of expenditures per pupil if there are 100 students is $1.00. Now assume that Community B has the same average residential property value (and no non-residential property), and the same number of students, but that the median-priced house in the community is valued at $75,000. In Community B, the median voter would pay $1.50 per dollar of educational expenditures per pupil both on average and at the margin. Notice that the tax price in both communities is halved if there is $5,000,000 of non-residential property in both communities. In this case, the tax price in Community A is $.50 and in Community B it is $.75.

The second component of the educational tax price reflects cost differences in the delivery of a unit of education. Under the assumption that a unit of education costs the same in all districts, Part B of the tax price formula may be arbitrarily set at $1.00, and the term can be droped from the equation. An alternative assumption is that educational cost varies across districts in relation to an observable variable. Previous analyses have used teachers' salaries and school district size as cost variables. Including teachers' salaries as a cost variable reflects an assumption that the market for teachers does not allocate teachers efficiently; i.e., that differences in teacher pay do not reflect teacher quality. If one assumes the opposite (i.e., that salary differences reflect quality differences), then variations in teachers' salaries do not

reflect differences in the cost of educational service, and should not be used as a factor in the price variable. [1] Unfortunately, it is impossible to test which of these assumptions is valid in New Hampshire because there are no data on actual teachers' salaries. While salary range data are available, these data do not reflect the classification of teachers within the range, and so are not useful to distinguish between the two assumptions.

While school district size has frequently been used as a measure of economies of scale in school spending, Denzau (1975, p. 246) reports that "district size was generally insignificant" as a factor explaining school spending in studies that he reviewed. Initial data analysis proved this to be true for our sample as well.

A non-demand variable that we did find to be highly correlated with expenditures was the fraction of students attending elementary school in the district. Approximately sixty of New Hampshire's school districts provide only elementary education, and in these districts, expenditures per pupil are substantially higher than in full-service districts. This is because class sizes tend to be much smaller for the elementary grades in districts where only elementary education is provided. In addition, fixed operating costs per pupil tend to be higher when only the elementary grades are represented.

As a result of this, we experimented with the variable ELEM (the fraction of students in the elementary grades). For school districts with only elementary grades, the variable was equal to 1, but it was never equal to zero. As reported in Chapter 5, this variable proved highly significant in the analysis. As a result, we used ELEM as a measure of $ /ESU in a number of equations.

Derivation of the Basic Estimating Equations Used in the Analysis

Demand for local public education was specified both multiplicatively and additively. The multiplicative specification allows for the marginal impact of each of the independent variables to depend on the levels of all of the independent variables. Multiplicative demand was specified as

$$(1.1)\quad ESUD = A(MFI)^{\alpha_1}(TP)^{\alpha_2}(BPSC)^{\alpha_3}(FAC)^{\alpha_4}(FESC)^{\alpha_5}(PRIVC)^{\alpha_6}(GROW)^{\alpha_7}$$

As ESUD is not observable, both sides of Equation 1 must be multiplied by $/ESU to obtain an estimating equation. Under the assumption that there are no cost differences in the provision of education across districts (i.e., $/ESU = $1 for all districts), one obtains after simple transformations:

$$(1.2)\quad \ln OPEXP = \alpha_0 + \alpha_1 \ln MFI + \alpha_2 \ln TP_A + \alpha_3 \ln BPSC + \alpha_4 \ln FAC + \alpha_5 \ln FESC + \alpha_6 \ln PRIVC + \alpha_6 \ln GROW.$$

It should be noted that Equation (1.2) is quite different from Feldstein's (1975) basic demand equation. Feldstein's demand equation was:

$$(1.2F)\quad \ln OPEXP = \beta_0 + \beta_1 \ln W + \beta_2 \ln INC + \beta_3 P + \beta_4 \ln SBG + \beta_5 \ln FG + \beta_6 RES + \beta_7 PRIVC + \beta_8 PUP, \beta_9 GROW.$$

---

[1] Levin, Muller and Sandoval (1973) have provided evidence to support this (latter) assumption. In studying the reasons for education cost variations among cities, suburbs and rural areas, they found that "central cities have higher teacher costs largely because they have a greater proportion of experienced teachers" (P. 12).

Where

W	=	equalized total property valuation in the school district per pupil
INC	=	median family income in the town
P	=	the state matching rate for school spending under the 1970 Massachusetts DPE formula
SBG	=	total state block grants to the school district
FG	=	total federal grant to the school district
RES	=	percent of property in the school district which was residential
PRIV	=	the number of private school pupils per capita in the school district
PUP	=	the number of public school pupils per capita in the school district
GROW	=	the ratio of number of pupils in the school district to the corresponding number five years earlier.

We believe that Equation (1.2) is a more appropriate specification of the determinants of educational spending than is Feldstein's equation (1.2F). The principal differences between Feldstein's Equation (1.2F) and Equation (1.2) lie in the treatment of the variables related to fiscal capacity. Most importantly,

- Feldstein uses W as a measure of fiscal capacity, whereas we do not. As argued by Ladd (1975), total property wealth enters this characterization through its influence on the price that the median voter pays for local public goods, but does not affect his/her ability to pay any given dollar amount in taxes.

- Feldstein uses INC as a "taste" variable, whereas we regard it as a measure of fiscal capacity.

- Feldstein uses P as a measure of tax price, although it only measures the rate at which the state matches local educational expenditures. Our price variable reflects the actual dollar cost of an educational service unit to the community's median vote.

- Feldstein uses total state and federal grants as variables, whereas we use per-capita grant amounts, again reflecting their impact on the median voter.

We have modified the basic multiplicative expenditure Equation (1.2) to account for cost differences imposed when a high proportion of school district expenditures are for elementary education. Under the premise that cost varies logarithmically with ELEM, the cost-adjusted demand equation is specified as:

$$(1.3)\quad ESUD = A \cdot MFI^{\alpha_1} (TP_A \cdot (ELEM)^{\beta})^{\alpha_2} BPSC^{\alpha_3} FAC^{\alpha_4} FFD^{\alpha_5} PRIVC^{\alpha_6} GROW^{\alpha_7}$$

and the estimating equation is:

(1.4) $\ln OPEXP = \alpha_0 + \alpha_1 \ln MFI + \alpha_2 \ln TP_A + \alpha_3 \ln BPSC + \alpha_4 \ln FAC + \alpha_5 \ln FED + \alpha_6 \ln PRIVC + \alpha \ln GROW + \alpha_8 \ln ELEM$

where $\alpha_8 = \beta\alpha_2$.

When demand is specified additively, the basic demand equation is:

(1.5) $ESUD = \alpha_0 + \alpha MFI + \alpha_2 TP_A + \alpha_3 BPSC + \alpha_4 FAC + \alpha_5 FEDC + \alpha_6 PRIVC + \alpha_7 GROW$

Under the assumption of invariant cost, the estimating equation is:

(1.6) $OPEXP = \alpha_0 + \alpha_1 MFI + \alpha_2 TP + \alpha_3 BPSC + \alpha_4 FAC + \alpha_5 FEDC + \alpha_6 PRIVC + \alpha_7 GROW$

If cost is assumed to vary linearly with ELEM, the linear cost-adjusted demand equation is:

(1.7) $ESUD = \alpha_0 + \alpha_1 MFI + \alpha_2 (TP_A \times \beta ELEM) + \alpha_3 BPSC + \alpha_4 FAC + \alpha_5 FEDC + \alpha_6 PRIVC + \alpha_7 GROW$

and the estimating equation is:

(1.8) $OPEXP = \beta_0 + \beta_1 (MFI \times ELEM) + \beta_2 (TP_A \times ELEM^2) + \beta_3 (BPSC \times ELEM) + \beta_4 (FAC \times ELEM) + \beta_5 (FEDC \times ELEM) + \beta_6 (PRIVC \times ELEM) + \beta_7 (GROW \times ELEM) + \beta_8 \times ELEM$

where

β_0 has an expected value of zero,

$\beta_8 = \alpha_0$

and $\beta_i = \beta\alpha_i$ for $i = 1,\ldots,7$.

Equations 1.2, 1.4, 1.6 and 1.8 were the basic determinant equations used in the analysis. Using these equations, we attempted to:

(1) verify the estimates obtained from the survey analysis of the fraction of intergovernmental education aid used towards educational expenditures,

(2) test whether municipal overburden affects school spending in New Hampshire, and

(3) simulate the prospective impact of five alternative school finance reform packages in New Hampshire with an eye toward assessing whether the resulting pattern of school expenditures would be wealth-neutral.

Methodology for Verification of Intergovernmental Aid Impacts in New Hampshire

If intergovernmental aid to New Hampshire school districts has a stimulative effect on school district spending, it is expected that the coefficients on the BPSC, FAC and FEDC variables in each of the estimating equations should be positive and significant. The results of the survey analysis are a guide

to the expected magnitude of these coefficients. The survey analysis indicates that on the average and in the long run, about $.35 of each dollar of BPT school aid and about $.64 of each dollar of foundation aid is devoted to increasing expenditures. As there are about six residents for each public school student in New Hampshire, one expects the coefficients in the BPSC and FAC variables to be about .06 and .11.

Unfortunately, it is very difficult to accurately estimate the expenditure impact of school aid in New Hampshire econometrically. The actual amounts of school aid distributed under the two main state programs and the various federal programs are extremely low in comparison to school operating budgets. As a result, the relative variance of each of the school aids is very small in relation to the variance of our dependent variables and this makes accurate econometric estimation difficult in the absence of a very large sample of observations. The results reported in Chapter 5 reflect this difficulty.

Methodology of Econometric Analysis of Municipal Overburden

The methodology for our econometric analysis of municipal overburden in New Hampshire closely parallels that of Miner and Sacks. The first step in the Miner/Sacks methodology is to identify and estimate a determinant equation for municipal expenditures, making sure to include all variables which are a-priori relevant to the overburden concept. The relevant variables used in the Miner/Sacks analyses for New York State were: property density (value of property per square mile), the ratio of wages of municipal workers to those of instructional employees, the ratio of average earning of government employees in the county to average earnings of government employees state-wide, the ratio of county shelter allowances for welfare families to the average of such allowances state-wide, the number of children qualifying for AFDC per 1000 estimated population, and the area of the school district in square miles. Each of these items was expected to have a positive impact on "uncontrollable" municipal costs in New York State (referred to also as the "minimum expenditure bundle"). In addition to these overburden-related variables, Miner and Sacks used three variables to measure "fiscal capacity": equalized property value per 1000 estimated population, adjusted gross income per 1000 population, and percent of total property value which was residential. The last of these three was intended as a price-related variable while the first two were intended as measures of ability to pay. Miner and Sacks wanted to test whether overburden-related variables have an impact on school spending. To do so, they attempted to determine the magnitude of the "minimum bundle" of municipal expenditure for each locality. In theory, a high minimum bundle per capita should exert downward pressure on school expenditures.

Miner and Sacks used a somewhat unusual technique to calculate the minimum bundle of expenditure for each community. They plugged the municipality's own characteristics except for fiscal capacity into the estimated determinant equation. In place of each municipality's own fiscal capacity variables, Miner and Sacks entered the 10th percentile levels of property value per capita and income, and the 90th percentile level of percent residential. The idea was to identify the municipal expenditure amount that would accrue if all municipalities had low fiscal capacity. According to Miner and Sacks, the resulting estimates were predictions of uncontrollable municipal expenditures.

In general, Miner and Sacks found that cities commonly believed to be overburdened did exhibit relatively high estimated minimum expenditure levels. However, these minimum expenditure bundles did not correlate negatively with school expenditures in their school expenditure regression equation. As their

work was done in New York, a relatively highly urbanized state, Miner and Sacks' results may be regarded as evidence that municipal overburden does not depress school spending. However, this was not their conclusion. According to Miner and Sacks (1980) ". . . we do not contend that we have conclusive evidence that local school taxes in large urban districts are not negatively influenced by the high non-school burden (p. 16)." While they do not indicate why this is not their conclusion, one possible reason is that their local expenditure determinant model may be incorrectly specified. The present analysis specifies both determinant equations differently from Miner and Sacks. While our overburden variables are similar to those used by Miner and Sacks (to the extent that comparable data are available for New Hampshire), the important differences in the approach used here lie in the specification of the fiscal capacity variable. As with our equation explaining school spending, we use neither property value per capita nor percent residential as independent variable, although Miner and Sacks used these variables in their equation. Conversely, we include the median voter price variable, while they did not. Although Miner and Sacks used their RES variable to reflect the price of local service, the tax price discussion above indicates that RES serves this purpose imperfectly.

We first experimented with the following demand equation for municipal expenditures:[2]

$$(1.9)\quad MPC = A(MFI)^{\alpha_1}(MTP)^{\alpha_2}(POP)^{\alpha_3}(DENS)^{\alpha_4}(GROW)^{\alpha_5}(1+WELFC)^{\alpha_6}(I + EMPLC)^{\alpha_7}$$

where

MPC = municipal operating expenditure per capita
MFI = 1979 estimated median family income
MTP = municipal tax price (median house value ÷ total equalized property value in the municipality per capita)
POP = 1980 population
DENS = property density (total equalized property value ÷ square miles)
GROW = rate of population growth in the municipality (1980 population ÷ 1978 estimated population)
WELFC = number of welfare clients in the municipality per capita
EMPLC = number of persons employed in establishments located in the municipality per capita.

MFI and MTP are fiscal capacity variables, while each of the remaining independent variables are related to the overburden concept. POP represents the demand for more municipal services in large cities as compared with smaller localities which may not have fire and/or public departments or public trash collection, etc. DENS and EMPLC represent the increased demand for fire, police, water and other services in towns with many or large commercial and industrial establishments. GROW represents the debt service obligations that go along with rapid growth. Finally, WELFC represents the demand for local welfare expenditures.

Equation (1.9) can be rewritten as:

$$(1.10)\quad \ln MPC = \alpha_0 + \alpha_1 \ln MFI + \alpha_2 \ln MTP + \alpha_3 \ln POP + \alpha_4 \ln DENS + \alpha_5 \ln GROW + \alpha_6 \ln(1 + WELFC) + \alpha_7 \ln(1 + EMPLC)$$

and further rewritten as:

$$(1.11)\quad \ln MPC \cong \alpha_0 + \alpha_1 \ln MFI + \alpha_2 \ln MTP + \alpha_3 \ln POP + \alpha_4 \ln DENS + \alpha_5 \ln GROW + \alpha_6 WELFC + \alpha_7 EMPLC$$

We also specified the demand for municipal operating expenditure in straight linear form as follows:

$$(1.12)\quad MPC = \alpha_0 + \alpha_1 MFI + \alpha_2 MTP + \alpha_3 POP + \alpha_4 DENS + \alpha_5 GROW + \alpha_6 WELFC + \alpha_7 EMPLC$$

Equation (1.11) proved to fit the data quite poorly, with none of the variables significant. Equation (1.12) showed somewhat greater explanatory power, but still only three variables were significant (MTP, WELFC and EMPLC), of which one (WELFC) had the wrong sign (-). Furthermore, in estimating the "minimum expenditure bundle" for each municipality, the use of Equation (1.12) did not rank New Hampshire's cities and towns in an order which made sense. (A number of New Hampshire's large cities, including the largest, Manchester, turned up to have only moderate overburden, considerably lower than many small towns.) In light of these unsatisfactory results, we ran equation without POP, DENS, GROW or WELFC, leaving EMPLC as the only overburden variable. This generated a reasonable pattern of "minimum expenditure bundles."

The next step was to enter the "minimum expenditure bundle" as a variable in the school expenditure determinant equation and test for the negativity and significance of its coefficient. A negative and significant coefficient would imply that municipal overburden may effectively depress school spending in New Hampshire.

Methodology for Assessing the Wealth-Neutrality of Predicted Educational Spending Under Alternative State Aid Formulas

We first test to see which of our educational expenditure Equations (1.2), (1.4), (1.6), and (1.8) best fit our data. Using the best equations, we then simulate the results of five alternative state aid formulas by inserting the appropriate prospective values for FAC&TP in the equation along with actual values of the other variables for each town. The resulting figures represent the predicted values of OPEXP for each town under the relevant state grant formula.

The five simulated state aid formulas are:

(1) full funding of New Hampshire's Foundation Aid Program.

(2) a DPE formula whichuses the district highest in property wealth per pupil as the key district;

(3) a DPE formula whichuses the district with the median value of property wealth per pupil as the key district.

(4) a formula which set the effective tax price (TP_A) for each

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[2]The variables EMPLC and WELFC were specified as shown in Eq. (1.9) because they both take on the value zero for some towns, which makes lnWELFC and lnEMPLC undefined for those towns.

districts at $.068, which was the lowest tax price of all districts included in our analysis, and,

(5) a formula which sets the effective tax price for each district at $.302, the median vlue for school districts in the sample.

The next and final step is to correlate the predicted values of OPEXP with property wealth per pupil in each town and test for the significance of the correlation. A significant and positive correlation would show that Feldstein's interpretation of the Serrano equity criterion would still be unmet by the state aid formula in question, while an insignificant correlation would indicate that the grant program would have a wealth-neutralizing effect in the Feldstein sense.

If is useful to compare our methodology for assessing the wealth-neutrality of our simulated expenditure patterns with Feldstein's methodology. According to Feldstein, the educational expenditure pattern is wealth-neutral if the coefficient α_1 in Equation (1.13) below is equal to zero:

$$(1.13) \quad \ln E_i = \alpha_o + \alpha_1 \ln W_i + u_i,$$

where u is a residual and i stands for the ith school district. Feldstein relates the coefficient α_1 to the coefficient in his general Equation (1.2F) as follows:

$$(1.14) \quad \alpha_1 = \beta_1 + \beta_2 \gamma_{pw} + \sum_{j=3}^{k} \beta_j \gamma_{x_j w}$$

where α_{i_j} represents the elasticity of variable i with respect to variable j.

If the parameter β_w is defined as

$$(1.15) \quad \beta_w = \beta_1 + \sum_j \beta_j \gamma_{x_j w},$$

then simple manipulations yield the following result:

$$(1.16) \quad \alpha_1 = \beta_w + \beta_p \gamma_{pw}$$

Feldstein notes that α_{pw}, the elasticity of the state matching rate (his price variable) with respect to w, is equal to 1 in the case of a simple DPE formula. Hence, according to Feldstein, DPE will have wealth-neutral results only if $\beta_w = -\beta_p$. His surprising conclusion is that the result of DPE could be that wealthier communities end up spending absolutely less than poor communities per pupil (if $\beta_w < -\beta_p$). In fact, he finds in his analysis that $-\beta_p$ does exceed β_w in Massachusetts for the year 1970.

On the basis of his results, Feldstein argues that a simple DPE formula goes too far in the direction of neutralizing the effects of wealth and actually has a discriminatory effect against districts richer in property. He warns that, under continued applications of the basic DPE formula, wealthier districts would be likely to opt out of public education altogether. The present analysis takes issue with this finding.

It should be noted that Feldstein's analysis cannot be repeated in New Hampshire because New Hampshire does not have a matching grant system for school districts; so that P = 1 for all school districts. However, it can be shown that

'the wealth-neutrality test proposed under our methodology would be identical to Feldstein's if P varied across school districts.

CHAPTER V

RESULTS OF ECONOMETRIC ANALYSIS

Our estimated equations (1.2), (1.4), (1.6) and (1.8) are reported as follows (t statistics in parenthesis; an asterisk marks all variables significant at the .05 level of confidence):

$$\underset{(1.2)}{\ln OPEXP} = \underset{(0.31)}{7.86} + \underset{(1.42)}{.063\ \ln MFI} - \underset{(3.76)}{.111\ \ln TP_A} - \underset{(2.81)}{.213\ \ln BPSC^*} - .068\ \ln FAC^*$$

$$- \underset{(0.10)}{.002\ \ln FEDC} + \underset{(2.67)}{.027\ \ln PRIVC^*} - \underset{(1.93)}{.695\ \ln GROW}$$

$$R^2 = .37$$

$$\underset{(1.4)}{\ln OPEXP} = \underset{(1.08)}{6.34} + \underset{(2.01)}{.186\ \ln MFI} - \underset{(1.53)}{.135\ \ln TP_A^*} - \underset{(2.85)}{.081\ \ln BPSC} - .059$$

$$\ln FAC^* + \underset{(0.00)}{.001\ \ln FEDC} + \underset{(1.40)}{.013\ \ln PRIVC} - \underset{(3.12)}{.976\ \ln GROW^*} + \underset{(6.31)}{.431\ \ln ELEM^*}$$

$$R^2 = .54$$

$$\underset{(1.6)}{OPEXP} = \underset{(0.55)}{4824.0} + \underset{(3.19)}{.024\ MFI} - \underset{(2.99)}{2339.\ TP^*} - \underset{(1.30)}{14.7\ BPSC^*} - 8.75\ FAC -$$

$$\underset{(1.12)}{16.2\ FEDC} - \underset{(0.64)}{19426.\ PRIVC} - \underset{(1.17)}{1324.\ GROW}$$

$$R^2 = .24$$

$$\underset{(1.8)}{OPEXP} = \underset{(0.76)}{797.0} + \underset{(2.57)}{.031\ (MFI \cdot ELEM)} - \underset{(1.45)}{1900.\ (TP \cdot ELEM)^*} - 10.8\ (BPSC \cdot ELEM)$$

$$\underset{(1.97)}{14.6\ (FAC \cdot ELEM)} - \underset{(0.49)}{12.6\ (FEDC \cdot ELEM)} - \underset{(1.45)}{41347.\ (PRIVC \cdot ELEM)}$$

$$- \underset{(3.72)}{4049.\ (GROW \cdot ELEM)^*} + \underset{(5.35)}{6930.\ (ELEM)^*}$$

$$R^2 = .51$$

Over the four estimated equations, all variables which are significant have the correct, or expected, sign except for the state aid variables and PRIVC. We comment on the aid variable coefficients in the following section. PRIVC alternately has positive and negative coefficients, but the only equation in which it appears with significance is (1.2), in which it has a positive coefficient. This is counter to the relationship that we expected, but is supported by similar finding in previous studies (see Denzau (1975)). Apparently, the percent of students attending private school in a community is correlated with other (omitted) characteristics which increase spending. PRIVC is left in the analysis below because of its proven ability to proxy for these characteristics.

Estimated School Spending Response to School Aids

The Business Profits and Foundation Aid variables sometimes show a negative impact on per pupil school operating expenditure, and this effect is even statistically significant for Foundation Aid in Equations (1.2) and (1.4), and for Business Profits aid in Equations (1.2) and (1.6). These anomalous results probably stem from three factors. First, as discussed in Chapter IV, the amount of these aids to school districts is extremely low in comparison with the dependent variables, so that any effects which do exist would be difficult to measure. Second, it is possible that these few aids are acting as proxies for omitted independent variables not included in the model, or that the effect of these aids can only be captured in the context of a more elaborate model. We did experiment with a simultaneous equation model to try and derive better estimates of the impact of all these aids. However, the method of indirect least squares, which is appropriate to the estimation of the simultaneous model that we employed, also produced negative coefficients for the aid variables.

In the absence of satisfactory results from all econometric techniques employed, we interpret our results to say that the effect of school aids in New Hampshire is not measurable in the context of a standard econometric determinant model. We attribute this to the very limited scale of New Hampshire's school aid programs in comparison with overall school operating expenditures.

In light of these results, we tentatively accept the results from the survey analysis, reported in Chapter III, as approximately correct, and use those estimates in performing the foundation aid simulation reported later in the chapter.

Estimated School Spending Response to Municipal Overburden

As discussed in Chapter IV, our municipal expenditure equation included only one overburden-related variable: EMPLC (employment per capita). The estimated municipal expenditure equation was:

$$MPC = 605.0 + 212.6\ EMPLC^{*} + .02472\ MFI^{*} - 141.0\ TP^{*}$$

When the 10th percentile value of TP and 90th percentile value of MFI were plugged into this equation, it generated a rank order of municipalities which appeared to be quite reasonable, although the state's largest city ranked only thirteenth on the list out of 220 municipalities. The predicted "minimum expenditure bundles" from this equation were entered as the variable OVER to Equation 1.8 (now 1.8') which was reestimated with the following results:

(1.8') $$\begin{aligned} \ln OPEXP = {} & 4.72 + \underset{(1.36)}{.240}\ \ln MFI - \underset{(2.47)}{.175}\ \ln TP - \underset{(1.10)}{.062}\ \ln BPSC - \underset{(2.71)}{.056}\ \ln FAC \\ & + \underset{(0.20)}{.0036}\ \ln FEDC + \underset{(1.26)}{.012}\ \ln PRIVC - \underset{(3.06)}{.993}\ \ln GROW + \underset{(6.69)}{.450}\ \ln ELEM \\ & + \underset{(0.26)}{.149}\ \ln OVER \end{aligned}$$

If municipal overburden is a factor depressing spending in New Hampshire school districts, one would expect the coefficient on OVER to be negative. The fact that it is positive resembles the results obtained by Miner and Sacks, although it is not significantly positive in the present analysis. For purposes of this analysis, one must conclude that either (1) municipalities with high required expenditure levels do not tend to spend less on their schools than they otherwise would, (2) a correct measure of municipal overburden has yet to be developed, or (3) the process by which burdensome costs are transmitted from one part of the local budget to the other is not yet fully understood, so that a correct model has yet to be specified to measure or explain it.

Simulated Impact of Alternative School Aid Formulas in New Hampshire

As discussed in Chapter IV, we simulated the impact of five alternative school aid formulas for New Hampshire and tested for Feldstein's wealth neutrality under each of the alternatives. The five formulas were (1) full funding of New Hampshire's foundation aid formula (FFFA), (2) a district power equalizing formula keyed to the district highest in property wealth per pupil (DPEH), (3) a district power equalizing formula keyed to the district with the median level of property wealth per pupil (DPEM), (4) a tax price equalization formula, wherein the state matches local expenditures in a manner that sets the effective median voter tax price equal to that of the district with the lowest tax price (TPEL), and (5) a tax price equalization formula which equalizes the effective tax price across districts at the level of the district with the median tax price (TPEM).

These five simulations were based on a variant of our estimated Equation (1.8). Equation (1.8) was selected for use through a procedure involving a comparison of adjusted R^2 across equations with the same dependent variables and then a comparison of transformed residual variance across the best of these. [1] Equations (1.4) and (1.8) dominated Equation (1.2) and (1.6) respectively in terms of the adjusted R^2 test, and Equation (1.8) had a lower value for transformed residual variance than did Equation (1.4).

Rather than using (1.8) for the simulation, the equation was reestimated, dropping the aid variables. This was done because the estimated coefficients for the aid variable were not supported by the theory, and, in general, they do not add substantially to the explanatory power of the equations.

The estimated equation used in the simulation was:

$$\underset{(1,9)}{\ln OPEXP} = \underset{}{4.371} + \underset{(2.06)}{.351}\ \ln MFI^* - \underset{(4.02)}{.238}\ \ln TP^* - \underset{(1.11)}{.010}\ \ln PRIVC - \underset{(2.55)}{.802}\ \ln GROW^* + \underset{(7.55)}{.488}\ \ln ELEM^*$$

As indicated, all variables in this equation had the expected sign and were significant at the .05 level except for PRIVC, which was not significant in this equation.

[1] See Rao and Miller (1971), pages 107-111, for a description of the appropriate test for proper specification in the case of transformed dependent variables.

To simulate the results of our first aid program (FFFA), we added 22% of the full funding foundation grant to the value of each school district's 1981 spending level as predicted by Equation (1.9). (22% was the fraction of foundation aid money that survey respondents from school districts eligible for this program indicated would be applied to operating expenditures -- See Chapter III).

The second and third formulas DPEH and DPEM, were simulated by replacing the TP_A variable with new variables $TP_{A;DPEH}$ and $TP_{A,DPEM}$.

Where

$$TP_{A,DPEH} = \frac{HVAL}{793524}$$

and

$$TP_{A,DPEM} = \frac{HVAL}{133525}$$

Under DPEH, Hebron was the key district in the state because it had the highest value of property wealth per student in 1980 of all school districts included in the study ($793,524). Hill had the median value of property wealth per student ($133,525), and was the key district under the simulated DPEM formula.

The fourth and fifth formulas, TPEL and TPEM, replaced TP_A with the values .068 and .302, respectively. These were the lowest and median values of local tax price for school districts included in the sample.

Table I below presents the results of each of these five simulations:

TABLE I

Actual and Simulated State Aid Formula	Correlation of Actual and Predicted Per Pupil Operating Expenditures with Per Pupil Property Tax Base	Predicted Average Operating Expenditures Per Pupil
1980 Actual	.55	2630
FFFA	.52	2678
DPEH	.16	3800
DPEM	.16	2447
TPEL	.23	3627
TPEM	.23	2544

The first line of Table I shows that the actual correlations of per pupil operating expenditures with per pupil property wealth in 1980 was .55, and that the average level of operating expenditures was $263.00 per pupil for districts in our sample. Full funding of foundation aid would change these numbers very little, reducing the correlation by only 3%, and increasing the average expenditure level by $48.00 per pupil, (of course, the increase in spending would be concentrated in low spending communities, so that recipient's expenditure level would be increased more substantially.)

The effect of changing the relative price of education to school districts in the state according to a power in price equalization formula is shown to be quite substantial. DPEH and DPEM would reduce the correlation of spending and wealth to .16, while TPEL and TPEM would reduce the correlation to .23. Notice that the degree of correlation between expenditures and wealth is independent of the choice of a key district, which could be predicted on the basis of statistical theory. The effective differences between the DPEH and DPEM (and also between TPEM and TPEL) formulas all in the resulting levels of expenditures and the cost of the programs to the state according to our simulation, DPEH would result in a very high average expenditure level, while DPEM would result in an expenditure level somewhat below the actual state average, and similarly for TPEL and TPEM.

The central conclusion of the part of our analysis is that even a complete DPE formula in New Hampshire would leave a small but positive correlation between spending and property wealth. The conclusion stand is in contradiction to Feldstein's and argues that a DPE formula administered in New Hampshire would not result in the sort of inverted spending pattern (wealth districts spending absolutely less than poor districts) that Feldstein claims would be induced.

APPENDIX I

CEFS RESEARCH PROJECT: QUESTIONNAIRE

CEFS at UNH is doing research on the interrelationships of school finance with municipal finance, including a study of state and federal grants. The purpose of this questionnaire is to obtain your opinion of what you anticipate local voter reaction would be to increases and decreases in state and federal grants to both the school district and municipality. As you consider your responses to this questionnaire, keep in mind that, according to the Department of Revenue Administration (DRA) data, a one mil tax in your community will raise $_____.

A. Business Profits Tax (B-P tax)

In 1980-81, your town received a total of $_____ from the B-P tax; allocated to reduce taxes as follows:

Town share $_____

School share $_____

County share $_____

1. Suppose you learned today that the school share of the B-P tax for your community were permanently cut to zero starting in 1981-82.

   a. We assume your 1981-82 budget as previously adopted would remain unchanged, and the tax rate would increase by an amount sufficient to compensate for the lost B-P tax aid -- is this correct?

   Yes_____ No_____

   If "No" please explain:

   b. In your opinion, would your school board vote to decrease its 1981-82 expenditures to compensate for some or all of the lost B-P tax aid?

   Yes_____ No_____

   If "Yes" please estimate by how much: $_____

   Please specify which programs you would eliminate or cut back:

2. Suppose you found out one year ago that the school share of B-P tax aid was to be permanently discontinued.

   a. In your opinion, would this reduce the 1981-82 capital or operating budget? Yes_____ No_____

   If "yes" please estimate by how much: Operating: $_____

   Capital: $_____

   Please specify which programs you would eliminate or cut back:

   b. In your opinion, would this increase the 1981-82 tax rate? Yes_____ No_____

3. Now suppose the 1980 school share of the B-P tax had been permanently discontinued in 1975. What effect do you think this would have had on your 1981-82 school budget?

   a. 1981-82 school budget would have been lower by $_____ .

   b. 1981-82 school tax receipts would have been higher by $_____.

   Please explain your decision:

   c. In your opinion, which operating budget items would have been affected?

   d. In your opinion, which capital programs would have been affected?

4. In your opinion, if the B-P tax aid were paid directly to the school district, would it have made a difference in your 1981-82 school budget? Yes_____ No_____

   Please explain:

5. In 1980-81, the total property tax in your community was lowered due to state grants totaling $_____, from the room-meals, interest-dividends, and B-P municipal and county shares.

   a. In your opinion, if these aids had been permanently discontinued beginning in 1980, do you think this would have had an effect on the 1981-82 school budget? Yes_____ No_____

      If "yes" please estimate the effect on the 1981-82 school budget:

      Please explain:

6. In your opinion, if your community had received no state grants under these programs since 1975, do you think this would have had an effect on the 1981-82 school budget? Yes_____ No_____

   If "yes",

   1981-82 school budget would have been lower by $_____.

   1981-82 school tax receipts would have been higher by $_____.

   Please explain:

B. Foundation Aid

In 1980-81, your community received $_____ in Foundation Aid. If the law were fully funded, you would have received $_____.

1. Suppose you learned today that there would no longer be any Foundation Aid starting in 1981-82.

   a. In your opinion, would your 1981-82 school expenditures have been reduced to compensate for some or all of the lost Foundation Aid? Yes_____ No_____

      If "yes" please estimate how much lower: $_____

   b. Please estimate the decrease in the following expenditure items:

      Capital: $_____

      $_____

      Operating: $_____

      $_____

   c. Please specify which programs you would eliminate or cut back:

2. Suppose you found out one year ago that Foundation Aid were to be permanently discontinued.

   a. In your opinion, would this have reduced the 1981-82 capital or operating budgets? Yes_____ No_____.

      If "yes" please estimate by how much:

      Capital: $_____

      $_____

      Operating: $_____

      $_____

      Please specify which programs you would eliminate or cut back:

   b. In your opinion, with the absence of Foundation Aid, would this have increased your 1981-82 tax rate and tax receipts? If yes:

      Tax receipts increase $_____

      Tax rate increase _____mils

3. Now, suppose the school share of Foundation Aid had been permanently discontinued in 1975. What effect do you think this would have had on your 1981-82 school budget?

   a. 1981-82 school budget would have been lower by $_____.

b. 1981-82 school tax receipts would have been higher by $_____.

Please explain your decision:

c. In your opinion, which operating budget items would be affected in 1981-82 with with the absence of Foundation Aid:

d. In your opinion, which capital programs would be affected in 1981-82 with the absence of Foundation Aid:

4. In your opinion, if the Foundation Aid had been fully funded in 1980-81, would your 1981-82 expenditure (capital or operating) levels have been higher?
Yes_____ No_____

a. If "yes" please estimate by how much higher: $_____

$_____

b. Please estimate the increase in the following expenditure items:

Capital: $_____

$_____

Operating: $_____

$_____

5. In your opinion, if Foundation Aid were fully funded in 1980-81, would your 1980-81 school tax rate have been reduced? Yes_____ No_____

Please estimate: $_____.

6. In your opinion, would full funding of Foundation Aid have affected municipal spending decisions in 1981-82? Yes _____ No _____

Please explain:

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POLICY PROPOSALS

Resulting from Research on

"The Impact of Intergovernmental
Grants and Municipal Overburden
on School Finance Equity"

By Margaret Goertz and
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University of New Hampshire
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I. Introduction

A. Purpose of Study

In the summer of 1980, the Center for Educational Field Services (CEFS) at the University of New Hampshire submitted an unsolicited proposal to the National Institute of Education entitled, "The Impact of Intergovernmental Grants and Municipal Overburden on School Equity--A Comprehensive Equity Approach to Finance Reform Research." In the abstract, CEFS summarized two major policy issues the study would address, stressing that the analysis would have policy relevance for both local finance in New Hampshire and school and municipal finance in general. The two policy questions CEFS set out to address are:

1. How much and what type of state funding of local school expenditures are necessary to achieve the simultaneous goals of taxpayer equity, student equity, and local choice?

2. To what extent should state grants to local school districts be based on considerations of municipal overburden, state grants to municipalities, and municipal expenditure decisions?

B. Description of New Hampshire's Educational/Municipal Finance System

In New Hampshire, the power to tax is constitutionally-vested in the state legislature. It permits local government to levy property taxes to support municipal, school, and county services. While property is assessed locally, the legislature still controls how it is assessed, property tax exemptions, interest rates on unpaid taxes, and collection procedures. Further, it authorizes the state Commissioner of Revenue to establish each local, school, and county tax rate after certifying the amount to be raised and applying state aids and other revenue sources.

While municipal, school, and county governments are funded primarily from the property tax, state government is funded mainly by specific taxes on rooms and meals, beer, tobacco, and gasoline; liquor sales; taxes on business profits, an income tax on interest and dividends; insurance premium and telephone taxes; and a variety of special activity taxes including racing and an estate tax. Except for a few earmarked taxes (gasoline, fishing licenses, etc.), the revenue goes into the general fund. Some general fund money is paid out to schools, municipal, and county governments to help keep down local property taxes.

The following table illustrates the major reliance on the property tax:

NEW HAMPSHIRE REVENUES--1981

LOCAL REVENUES	
Property Taxes	$482,000,000.
Other Taxes & Fees	89,000,000.
State Aid to Cities & Towns	102,000,000.
Federal Grants	68,000,000.
	$741,000,000.
STATE REVENUES	
Business Profits	$ 57,000,000.
Gas & Road Tolls	47,000,000.
Liquor & Beer	46,000,000.
Rooms & Meals	31,000,000.
Tobacco	27,000,000.
Motor Vehicle Fees	23,000,000.
Insurance Premiums	15,000,000.
Interest & Dividends	14,000,000.
Other Taxes & Fees	146,000,000.
Federal Grants	246,000,000.
	$652,000,000.

C. Structure of New Hampshire's School System

New Hampshire is unique in several ways which have a direct bearing on an understanding of the policy issues. With about 920,000 people, it has a legislative body of 424, 400 representatives and 24 senators, giving it the distinction of having the largest state legislature in the nation and the third largest in the English-speaking world, next to the U.S. Congress and the British Parliament. Ninth state in the nation to ratify the U.S. Constitution, New Hampshire has a long tradition of local control of government services. Its early reliance on the local property tax to fund such services goes back to the colonial period, and has continued up to this day. There is neither a state income tax nor a sales tax in the Granite State. Only the legislature can authorize, regulate, or levy a tax of any sort.

The 234 cities and towns and 169 school districts rely heavily on the local property tax to pay for their respective services. While municipal governments receive approximately one third of their revenue from the local property tax, school districts receive about 88% of their money from that source, with the balance divided nearly equally between the state and federal governments. New Hampshire school districts receive a smaller percentage of state aid than all the other states and territories (except Hawaii).

New Hampshire has 169 school districts that were responsible for educating 163,868 children in 1981-82. These districts vary considerably in their size, responsibilities, governance and finance structure.

New Hampshire school districts range in size from 9 to 13,885 students. Eleven school districts do not maintain any local schools; their voters have decided to tuition resident children to schools in nearby communities. There were 90 high schools in the state in 1981-82; ranging in size from 7 students in Errol, a small mountain town with a two year high school (juniors and seniors travel to the city of Berlin), to 2800 in Nashua, the state's second largest city. The only district with more than one high school is Manchester, the largest city, which maintains three high schools.

The State Board of Education has assigned New Hampshire's 169 school districts to 53 school administrative units, each administered by a superintendent of schools. Sixteen of the 53 superintendents have single district school administrative units; the remaining 37 have from two to nine separate school districts, each with its own school board. In these latter cases superintendents report to each local school board, the combined local boards that comprise the school administrative unit, and to the Commissioner of Education.

Twenty-eight of these school districts are cooperative school districts, created through a consolidation or merger of 103 out of New Hampshire's 236 "pre-existing districts" or towns. Four of these cooperative districts are secondary districts only. The pre-existing school districts in these four cooperatives provide elementary and/or middle school education on their own.

Each school district is an independent taxing authority. Except for nine of the city districts, where the city council votes the annual school budget, New Hampshire law enables the voters in each school district to establish their local school budget. (In Concord, the State Capital, the school board is fiscally independent.)

School budgets are developed in a manner similar to that followed by most school districts in the United States: staff requests are reviewed by appropriate supervisors up to the superintendent, who submits a budget recommendation to the school board. Each board determines what to recommend to the voters. In 56 districts, however, that have adopted New Hampshire's municipal budget law, the budget goes from the school board to a municipal budget committee before it goes to the voters. Voters may not increase the budget committee's dollar request by more than ten percent.

Once the school budget is set, it is the responsibility of municipal officials to collect the property tax receipts from each property owner, and make payments to the school district treasurer of the school district's share. That share is determined by a school tax rate which is established by the State Commissioner of Revenue Administration, who also establishes the municipal and county tax rates. The school, municipal and county tax are separately itemized on each property owner's tax bill.

The state provides from 6 to 8% state aid each year, depending on the legislative appropriation. The major state aids are:

School Building Aid, which provides 30% of the principal payment on bond issues, with an additional 5% per district in regional schools to a maximum of 55%;

Special Education Aid, which pays about 25% of the total cost of educating the handicapped (a new equalizing formula channels most of the money to property-poorer districts);

Foundation Aid, which should pay about 10% of total public school costs, with funds earmarked to needier districts (the legislature typically appropriates only 1 to 1.5%);

Vocational Aid, where costs of constructing new regional vocational schools are paid in full by the state and sending districts receive 75% of tuition payments and full transportation costs; and,

Sweepstakes Aid, a flat grant per pupil allocation. There are several smaller additional state aids.

The total state aid in 1980-81 was $29,928,172 out of a total $391,916,234 appropriated by local districts. The state also provided $22,037,345 to reduce school taxes from business profits tax receipts, a property tax relief program.

II. Determinants of Education Spending

Econometric models, based on current research on determinants of educational and municipal spending, were developed to examine (1) the impact of New Hampshire's existing state/local school finance system on education expenditures; (2) the relevance and impact of municipal overburden on local spending; and (3) the prospective impact of alternative school finance reforms in the state.[1]

Not surprisingly, due to the heavy reliance on local funding, the fiscal capacity of school districts is important in explaining the variation in school spending across the state: districts with more taxable resources spent more on education. Another significant factor affecting local spending decisions is "tax price", the cost to the "average" taxpayer of increased education spending in a community. If a community has a large proportion of its tax base in non-residential property, the homeowning taxpayer will share the cost of increased local property taxes in support of education with the owners of industrial and commercial. It is assumed, therefore, that this homeowner will be more willing to support increased spending for education than a homeowner in a community where residential property taxpayers pay a larger share of school taxes. In New Hampshire, communities with low "tax price" values tend to spend more on education than those with high "tax price" values.

A more interesting finding concerns the impact of Foundation Aid and the school share of the Business Profits Tax distribution on education spending. The effect of these revenues on levels of spending was not significant, and in the case of Foundation Aid, showed a negative relationship.[2] The results probably stem from two factors. First, the amount of these aids is extremely low in comparison to revenues raised from the local tax base. Therefore, fiscal capacity and tax price factors will become much more significant in explaining the level of local spending. Second, it is possible that because state aid revenues are so small, their effect cannot be measured in the context of a standard econometric determinant model.

Municipal overburden does not appear to affect the level of education spending in New Hampshire. Municipalities with high required non-school expenditures do not tend to spend less on their schools than they otherwise would. The econometric model used in this study, however, may not be capable of measuring the process by which burdensome costs are transmitted from one part of the local budget to the other.

Finally, two other characteristics of the school districts appeared to explain some of the variation in school spending. Expenditures in districts which provide only elementary education were significantly higher than in full-service districts, while districts with the lowest rate of growth tended to spend more than faster growing (or slower declining) communities.

In order to analyze some of these relationships more thoroughly, a questionnaire was sent to school district superintendents and school board members, designed to elicit their assessment of the short run and medium run impact of state education aids on school expenditures in their communities. These findings are discussed next.

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[1] The design of these models is explained in detail in Michael Conte, "The Impact of Inter-Governmental Grants and Municipal Overburden on School Spending and Simulations of the Impact of Alternative Grant Formulas", UNH Oct. 1982

[2] The effect of the Business Profits Tax distribution was sometimes negative and sometimes positive, depending upon the estimating equation used. Conte, P. 45

III. Response of Local School Districts to Changes in Aid

Responses from the questionnaire address the question, "To what extent should state grants to local school districts be based on considerations of municipal overburden, state grants to municipalities, and municipal expenditure decisions?" More directly, an analysis of these responses showed "that municipal overburden may not substantially affect the way intergovernmental grants are spent in New Hampshire." Municipal overburden is not a major factor in New Hampshire school finance policies and procedures.[3] On the other hand, state grants to municipalities and municipal expenditure decisions are a major factor. Conte[4] concludes "the interplay of the two local budgets (school and municipal) is quite substantial but also quite complex." He states that the interplay is effective throughout the range of income and wealth.

Except in the state's nine cities, the annual school operating budget is set by the local voters in a New England town meeting type of setting called the annual school district meeting. Voters at these meetings may participate at their local town meeting to raise money for municipal expenditures as well. Thus, it follows that their decisions are based on knowledge of the impact of more or less state aid and/or federal grants to either the school district or to the municipality.

For over a quarter century, New Hampshire has had a foundation aid program to aid needy (property poor) school districts. The legislature has paid only token attention to the law, typically appropriating less than 10% of the entitlement (entitlement based on 14 mils $\bar{x}$ local equalized valuation less number of resident pupils $\bar{x}$ state average per pupil cost). Perhaps because of the long history of low funding, questionnaire respondents indicated little concern with a short-run drop in aid. Of concern is the fact that 64% see a major problem in passing school budgets in the long-run (up to five years) if foundation aid were to be eliminated. A majority of the respondents predict a substantial drop in property taxes if the aid program were fully funded, and believe this would have a positive effect on overall municipal spending decisions.

Questions dealing with the business profits tax (BPT) (school share) brought out many interesting results, perhaps because this aid goes to reduce property taxes in all communities, where foundation aid typically helps less than 40. Conte points out that loss of BPT would result in lower school spending among 34% of the respondents...weighted more heavily in the income and wealth poorer groups of districts. Conte reports the average immediate reduction in school expenditures at 17% (27% in low income districts, 12% in high income). The one-to-five year impact of loss of this aid is even greater: 28% to 35% reductions overall.

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[3] Conte, P. 31.

[4] Ibid.

Clearly, a state policy shift to cut business profits tax as a property tax relief program to school districts would cause cuts in educational programs. Conte summarized which programs would be cut as follows:

	Number of Times Mentioned
Staff cuts	14
Athletics	11
Transportation	8
Music	7
Equipment	6
Teacher Aides	6
Increase Class Size	5
Art	5
Maintenance	5
Extracurricular	4
Supplies	4
Administration	3
Guidance	3
Library/Audio Visual	3
Repairs	3
Hot Lunch	2
Special Education	1
Texts	1

Of further interest to state policymakers is the predicted impact on school budgets if state aid that goes directly to municipal governments were cut. 54% of the respondents stated there would be a negative impact on the school budget if such aids had been cut over the past five years--69% of low wealth districts, 50% of high wealth. The average budget cut predicted was 27%.

The above data makes clear the existence of a very close relationship between school and municipal finance, and the importance of state grants to both units of government. One could infer that federal grants have a similar impact as New Hampshire school districts receive about the same percent of federal aid as state aid. CEFS polled the state's 53 superintendents to determine what would be the likely effects of termination of Title I, the largest single federal aid. 39 superintendents responded, and nearly all opined that the program would be cut in direct proportion to the federal cut.

In addition, research conducted by Professor Richard England on the interrelationships of geographic location, community growth, and local public finance[5] concludes that pressures are on local officials to upgrade municipal services which will benefit business investors and attract new commercial development. England's work suggests that at the same time homeowners are willing to support higher taxes to increase school expenditures "...since better-funded public schools seem to be associated, ceteris paribus, with higher market prices of houses..."[6] England goes on to point out how the stage is set for "...conflicting pressures on the determination of municipal and public school budgets at the local level. To the extent that business interests and job-conscious residents prevail in the budgetary process, there will be a tendency to divert local property tax dollars from public school budgets to municipal government budgets. Ironically, if all localities in a fiscally decentralized system respond to these economic pressures, then all public school systems will find it difficult to finance their outlays strictly via local property tax revenues, with the ironic consequence that business investors will find it more difficult to recruit educated workers throughout the system. This tendency may help to explain why most state governments feel compelled to impose minimal educational requirements on their local school districts and why those same state governments provide educational grants which help to finance compliance with those state requirements."[7]

The above research findings argue strongly for a significant role of state government in financing public elementary and secondary education in New Hampshire to achieve the goals of increased student equity, taxpayer equity, and local choice. What form should that aid take? The next chapter describes alternative school finance policies New Hampshire must consider to achieve such goals.

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[5]Richard England, "Local Public Finance, Geographic Location, and Community Growth: Some Recent Evidence from New Hampshire," UNH, June 1982, p. 34.

[6]Ibid.

[7]Ibid, pp. 34-35.

IV. Designing a New School Finance Formula

A final activity in this study was to develop several alternative finance formulas that would address the second policy question: How much and what type of state funding of local school expenditures are necessary to achieve the simultaneous goals of taxpayer equity, student equity and local choice? Five alternative school aid formulas were simulated that incorporated the research findings discussed in the previous two sections of this report.

- full funding of New Hampshire's foundation aid formula (FFFA);
- a district power equalizing formula keyed to the district highest in property wealth per pupil (DPEH);
- a district power equalizing formula keyed to the district with the median level of property wealth per pupil (DPEM);
- a tax price equalization formula, where the state matches local expenditures in such a way that every district can behave as though they had a tax price equal to the district with the lowest tax price (TPEL); and,
- a tax price equalization formula keyed to the district with the median tax price (TPEM).

New school spending levels were estimated using a variant of the determinants equations used earlier in the study.[8] Finally, these predicted expenditures were correlated with district property wealth to see whether they decreased the relationship between school spending and property wealth that currently exists in New Hampshire.

Table 1 presents the results of these simulations:

TABLE I

Actual and Simulated State Aid Formula	Correlation of Actual and Predicted Per Pupil Operating Expenditutes with Per Pupil Property Tax Base	Predicted Average Operating Expenditures Per Pupil
1980 Actual	.55	$ 2630
FFFA	.52	2678
DPEH	.16	3800
DPEM	.16	2447
TPEL	.23	3627
TPEM	.23	2544

The first line in the table shows that a strong correlation exists today between per pupil operating expenditures and per pupil property wealth. Full funding of the state's foundation program would have little impact on this relationship or on raising the average level of expenditures in the state. However, this approach is by far the least expensive of the five alternatives, and is designed to concentrate increases in spending in the lowest wealth communities, which are generally also the lowest spending communities in New Hampshire.

[8]See Conte, PP. 47-49 for the Methodology employed in these simulations.

The other approaches reduce the wealth/expenditure relationship considerably. Of interest here is the fact that the choice of a key district within each approach does not affect the correlation.[9] This choice does have a significant impact, however, on the cost of the formula, and on the level of predicted operating expenditures. Formulas keyed to highest wealth districts are expensive, and drive up the level of spending, but they do not change the wealth expenditure correlation. The methodology employed in this study does not enable us to look at measures of student equity. An unanswered question is what are formulas that yield greater taxpayer equity and local choice and will also result in greater student equity.

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[9] Conte states that this finding could be predicted on the basis of statistical theory. P. 49.

V. Conclusion

The research findings emphasize the very strong interrelationship between school finance and municipal finance in New Hampshire, and suggest that state policymakers must not change one state aid plan without considering the effects on others. The results strongly suggest the need to retain the current policy of providing grants to municipalities, as any cutback would have devastating effects on school budgets.

The tendency to divert local property tax dollars from public school budgets to municipal government budgets should be a cause for concern among state policymakers who have the ultimate responsibility to provide public education for the state's school children. The research suggests that states which rely heavily on the local property tax to fund both public education and municipal services should investigate alternative revenue sources for public education, if they are experiencing economic pressure to improve municipal services. The research points out the lack of significant municipal overburden in New Hampshire.

Finally, the writers believe more study is necessary to develop a state aid formula that will achieve the simultaneous goals of taxpayer equity, student equity, and local control.